

FEBRUARY 1, 1961

AUTOMOTIVE INDUSTRIES

ENGINEERING • MANAGEMENT • PRODUCTION • DESIGN

A CHILTON PUBLICATION

FORGING AHEAD

SEE PAGE

33

With Automotive Drop Forgings

By DWIGHT M. ALLGOOD



ALSO IN THIS ISSUE

**LATEST DESIGNS
IN MARINE ENGINES**

**UNIQUE MONORAIL
VEHICLE SYSTEM**

**MORE ZINC USED
IN PASSENGER CARS**

**NEW MANAGEMENT
AT FORD MOTOR CO.**

Theodore O. Yntema

Vice President and
Newly-Elected

Chairman of Finance Committee
Ford Motor Company

PAGE 25



DU PONT ADIPRENE[®]

URETHANE RUBBER POLYMERS

New Urethane Elastomers That Combine Hardness, Resilience and Exceptional Load-Bearing Capacity

ADIPRENE polymers are members of Du Pont's new urethane rubber family. These urethane polymers can be compounded in a wide range of hardnesses and retain their elastomeric properties throughout this range. They combine the resilience of rubber with the hardness and load-carrying capacity normally associated with many metals and hard plastics. To engineers, they provide a new class of materials and a new approach to automotive design problems.

Products made from ADIPRENE urethane rubbers are well suited for service in lubricating oils, greases and automotive fuels. They withstand attack by ozone and oxygen and are resistant to salt solutions, dilute mineral acids and bases. ADIPRENE compounds also have outstanding resistance to abrasion and impact and excellent low temperature properties. (Low temperature brittle point less than -80° F.)

Most of the raw ADIPRENE polymers are liquid at room temperature, which makes them ideal materials for casting complicated molded parts. Vulcan-

ized, high durometer compounds are as machinable as some metals. They can be drilled, turned and shaved on standard metal working equipment.

These properties of ADIPRENE polymers suggest a wide range of automotive applications. Current and potential uses include: seals, grommets, bushings, ball joint liners, engine and body mounts, striker plates, encapsulated electrical assemblies, abrasion-resistant coatings for underbody parts and solid industrial tires for manufacturing plants. ADIPRENE elastomers should be treated as new materials, and parts designed to take full advantage of their special properties. Mere substitution of an ADIPRENE in an existing design may not produce optimum results.

We will be glad to send you complete information on the engineering properties and performance of ADIPRENE urethane rubbers. We'll also begin your free subscription to the quarterly, *ELASTOMER NEWS FOR AUTOMOTIVE ENGINEERS*. Just write: E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Dept. AI-2, Wilmington 98, Delaware.

PROPERTIES OF CURED ADIPRENE POLYMERS

(Softer compounds ranging from 10 Shore A are also available.)

Hardness, Shore A	88	95	97	99+
Hardness, Shore D	43	50	60	78
Modulus, 300%, psi	2100	3200	7000	—
*Tensile Strength at Break, psi	7000	8825	8500	8500
Elongation at Break, %	450	480	340	250
Izod Impact Notched ft.-lbs./in.	Flexed	Flexed	> 20	1.2
Split Tear, ASTM-D 470 lbs./linear inch	50	155	160	200
**Compression/Deflection, psi @ 5% defl.	575	750	1800	6000
Rebound Resilience, %	45	40	42	45
Oil Resistance	Excellent	Excellent	Excellent	Excellent
Low Temperature Brittle Point, °F.	< -80	< -80	< -80	< -80

*Samples pulled @ 1 in./minute (elastomer stocks normally pulled @ 20 in./min.)

**Shape Factor—1.0

ADIPRENE[®]
URETHANE RUBBER



**Better Things for Better Living
... through Chemistry**



Savings Pile Up With Torrington Needle Bearings

You get performance-plus at a low, low unit cost when you specify Torrington Needle Bearings. A full complement of small-diameter rollers provides a maximum number of contact lines. The result—a higher radial load capacity at a lower unit cost than any other bearing of comparable size or performance.

Precision rollers operate smoothly and efficiently, with a low coefficient of starting and running friction. Positive roller retention is insured by turned-in lips on the outer shell, permitting faster and easier installation or assembly.

Your Torrington representative is an expert on Needle Bearings. For full information on how they can bring savings and improved product design and performance call Torrington—maker of every basic type of anti-friction bearing.

TORRINGTON NEEDLE BEARINGS FEATURE:

- Full complement of retained rollers
- Unequalled radial load capacity
- Low coefficient of starting and running friction
- Low unit cost
- Long service life
- Compactness and light weight
- Runs directly on hardened shafts
- Permits use of larger and stiffer shafts

progress through precision

THE TORRINGTON COMPANY

TORRINGTON BEARINGS

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Provide mirror-bright beauty that lasts with Double-Layer Nickel Plating!

This mirror-bright Double-Layer Nickel Plating can help sell a car.


Its durability can help keep a customer sold.

Beauty and durability...that's what you get with Double-Layer Nickel Plating. When a coating of bright Nickel is deposited over a layer of semi-bright Nickel, all under a thin layer of chrome, the enduring beauty of automotive brightwork is assured. This thick, durable combination offers positive protec-

tion against rust and other corrosion, and also offers excellent resistance to abrasion and wear.

All automotive trim parts can have a durable and matching finish with Double-Layer Nickel Plating — lamp bezels, grilles, door handles, horn rings — no matter what basis metal is used.

For more information about the performance of versatile Nickel coatings write for your free copy of the booklet *Decorative Plated Coatings of Improved Durability*.

The International Nickel Company, Inc.
67 Wall Street  New York 5, N. Y.

Inco Nickel

Nickel makes plating perform better longer

AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE • PUBLISHED SEMI-MONTHLY

FEBRUARY 1, 1961

Passenger Cars • Trucks • Buses • Aircraft • Tractors
• Engines • Bodies • Trailers • Road Machinery •
Farm Machinery • Parts and Components • Accessories
• Production and Processing Equipment •
Design • Production • Engineering • Management

VOL. 124 No. 3

Features • • •

▼ New Management Setup at Ford Motor Co.

Some recent changes in names and titles, as well as realignment of Line Groups, have taken place at Ford Motor Co. The latest changes are described in this article.

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▼ Forging Ahead With Automotive Drop Forgings

The commercial drop forging industry is one of the most competitive in existence. In addition to competition with each other, commercial makers of drop forgings face the competition of "captive" shops, as well as the competition of castings.

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▼ Designing a Display of Tomorrow's Transportation

A unique monorail system for the high-speed transportation of personal vehicles that could operate on and off the system was featured at McLouth Steel's exhibit at the SAE Convention in Detroit.

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▼ 1961 Marine Engines

A number of new marine engines, in addition to four inboard-outboard power

plants, are offered for 1961. They are described and illustrated in Part II of a two-part article.

Page 44

▼ Passenger Car Makers Using More Zinc Die Castings

Zinc's position in the automotive industry is stronger than it has ever been. Problems of corrosion in plated zinc die castings have been solved and the demand for galvanized sheet is creating new demands.

Page 47

▼ Machine Tool Builders Report Moderate Improvement in Business

An extensive survey of the machine tool builders by AUTOMOTIVE INDUSTRIES indicates gains in order backlogs, inquiry activity, and in prospective business.

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▼ Nine New Product Items and Other Features Such as:

Machinery News; Manufacturers' News; Automation News Report; Industry Statistics; Airbriefs; Metals; and News of the Automotive and Aviation Industries.

... continued on next page

MEMBER



National Business
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Business Publications
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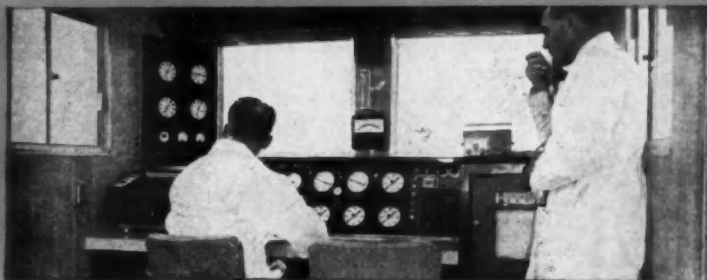
ANOTHER CUSTOMER SERVICE FROM BENDIX . . . Brake Headquarters of the World

A Complete Brake Engineering Test Laboratory at your door

Bendix maintains a fleet of mobile brake laboratories which are available to you. These laboratories contain advanced brake testing instruments and are manned by Bendix engineers. They bring Bendix brake experience and know-how right to your doorstep.

The newest of these mobile labs, shown below, provides outstanding facilities for testing heavy-duty brakes. Latest electronic instruments observe and record temperatures, pressures and displacements in every part of brakes being tested—they take the pulse of brakes working under GCW loads up to 65,000 pounds.

Bendix designs, tests and produces more brakes than anybody else in the business. And mobile laboratory service is only one of the many advantages offered by Bendix . . . "brake headquarters of the world." For help on your brake problems, write, wire or phone our Customer Application Engineers at South Bend.



Newest Bendix mobile brake laboratory tests heavy-duty brakes. Top photo shows Bendix engineer at instrument panel inside mobile lab.

Bendix PRODUCTS
DIVISION South Bend, IND.



How the choice of a cutting fluid affects your costs

Often—perhaps too often—the supplier of cutting fluids for machining or grinding, points to the quality of the work and totally ignores its surprising counterpart—a lower overall cost of operation.

Many a user of petroleum-base fluid might never notice the oversight. A better fortified coolant, which costs more per gallon, would not seem to reduce the final cost of the work, although it can readily be proven to produce better machined parts.

But it is pertinent to examine more closely the cost factors. The facts may surprise machine shop men who have not fully considered all the items which influence their costs. The measurable, tangible cost factors are these:

- Initial cost
- Cost of mixing
- Production rates
- Tool or wheel life
- Machining cost
- Overhead
- Cost of cleaning
- Life of the fluid
- Cost of rejects
- Reworking costs caused by rust

A comparison of first cost with final cost per piece, made on the basis of long experience with both conventional water-soluble oils and the newer chemically conceived fluids reveals some astonishing figures. Just a quick glimpse:

- The modern fluid costs about four times as much as the old soluble oil.

- But that modern coolant can be cut with three times as much water as the oil-base fluid.

- The modern coolant requires less make-up.

- It lasts over six times as long as the oil emulsion—contains nothing to make it turn rancid.

- It enables faster production—machines can be speeded up.

- It requires less frequent emptying and cleaning of machines.

- The over-all cost of coolant per piece produced has repeatedly proved



to be upwards of 40% less with a good chemically conceived coolant than with a conventional soluble oil!

There are intangibles, too, which are not as measurable, but which affect both cost and quality. To mention a few: Cleanliness of shop, operator satisfaction, visibility of work, smoke problems, accuracy of work, adaptability to a wide range of jobs, and safety (fire hazard, slipperiness of floors, etc.).

It is illuminating to examine all of these direct and indirect influences a cutting fluid can exert. Little wonder that it is termed the "third leg" of the base on which successful ma-

chining depends—the others, of course, being the tooling and efficiency of the machine itself.

Our concern is with the fluid itself, because Houghton has made and supplied many types through the past half-century.

Our recent successes have been with the chemically conceived types of coolants, scientifically fortified to do a double job of improving quality and cutting final costs. *Hocut 237* is a perfect example of such a coolant. Data on its applications and availability will gladly be supplied. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

Houghton

INDUSTRY'S PARTNER IN PRODUCTION

New

RED RING MACHINE SHAVES LARGE GEARS FASTER... MORE EFFECTIVELY

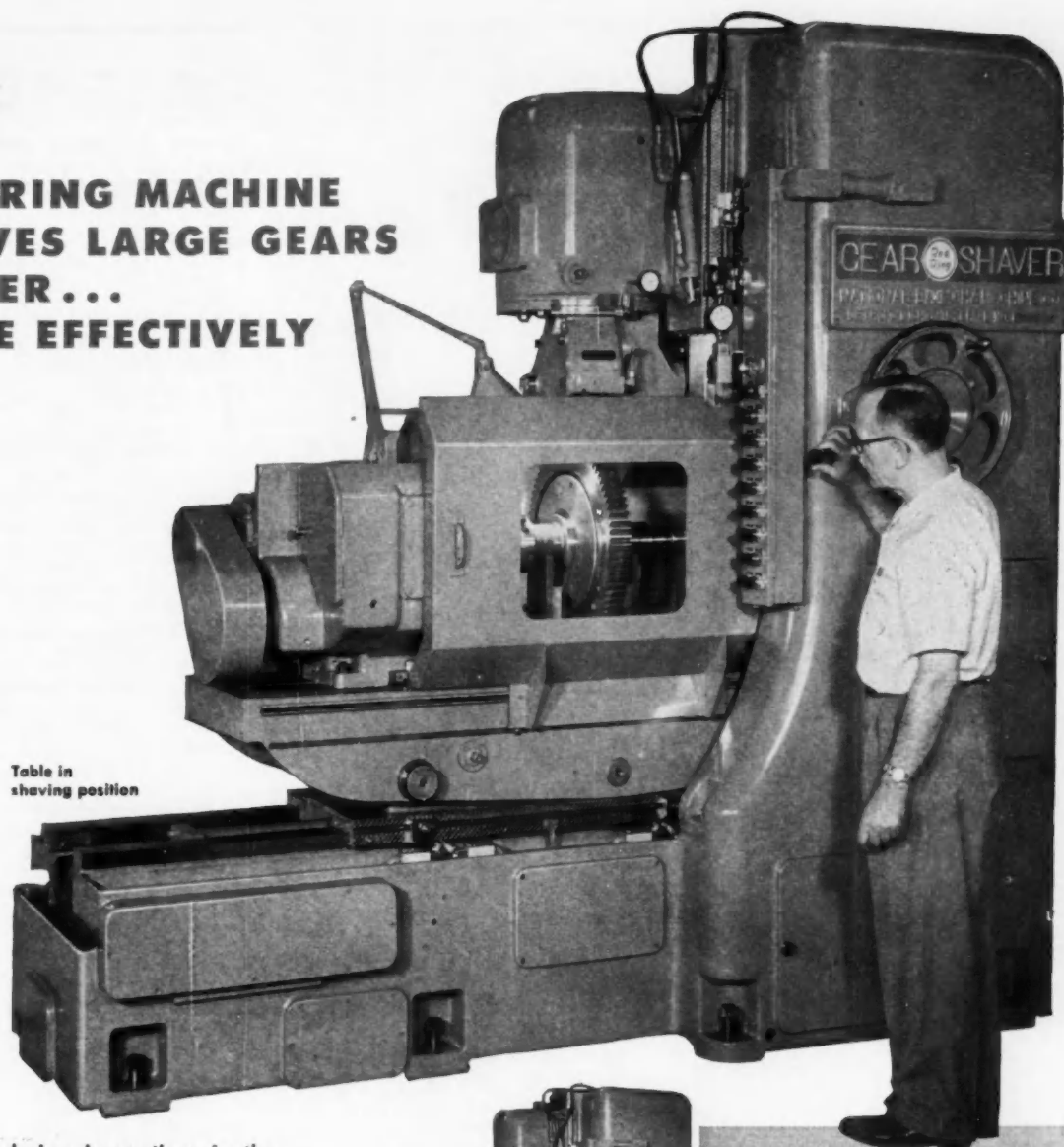


Table in
shaving position

Significant design innovations in the New Model GCX enable you to shave the larger, heavier gears (up to 24" Pitch dia.) with the same facility and precision as smaller gears are shaved.

Methods of loading and unloading are unrestricted. The work is loaded with the table at the extreme limit of its travel—clear of any overhead interference.

At the end of the shaving cycle, the cutter head rises in rapid traverse to clear the work and the table returns to its loading station for quick unloading.

If you manufacture such gears as are used in trucks, agricultural or ordnance equipment, ask for Bulletin S60-8 and get the full details of this new, economical method of gear shaving.

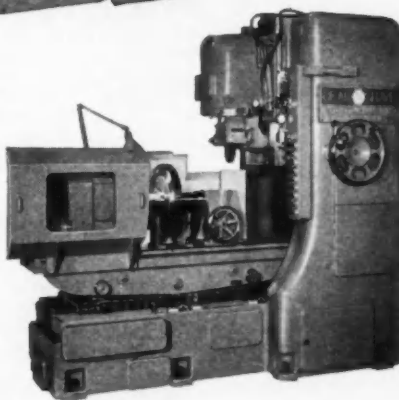


Table in
loading position

EXCLUSIVE RED RING ADVANTAGES

- Cutter above the work permits chips to fall away from and not into the cutter teeth.
- Thus positioned, the cutter is not vulnerable when the work is accidentally dropped while being loaded.
- Cutting pressure is applied downward, taking full advantage of gravity for rigid stability.
- Floor space, less — Rigidity, greater

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING,
GEAR HONING AND ELLIPTOID

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING AND HONING EQUIPMENT



Payloader H-70—photo courtesy The Frank G. Hough Co.

R/M sintered friction development use-proven in over 6000 Payloaders

The Hough-built "PAYLOMATIC" P-600 full power-shift transmission utilizes a wet-friction application jointly developed by The Frank G. Hough Co., Libertyville, Ill., and Raybestos-Manhattan.

No friction failures

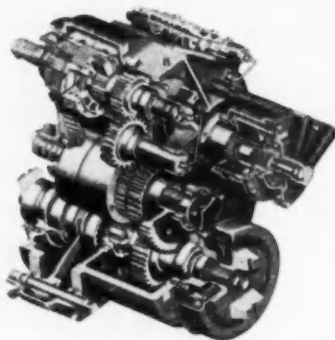
Project engineer Harry Wilson says: "We have over 6000 units in the field. There hasn't been a friction failure in the lot. The design we developed with R/M's co-operation has been use-proven. We're well satisfied with R/M's ability to help design and then deliver a superior friction material at a competitive price."

Several types of materials were tested in R/M laboratories and then on Payloader tractor shovels. Sintered bronze was the material chosen for the friction plates. Plate speeds range from 1370 to 6140 rpm; gross plate pressure to 180 psi.

Unbiased recommendations

Wherever you are, one of R/M's 25 sales engineers can be at your desk within 24 hours to help you tackle any friction material problem. *Only R/M manufactures all types of friction materials—your assurance of unbiased recommendations!*

Send for your free copy of R/M's Bulletin No. 501. It is packed with helpful engineering information. Write today.



"PAYLOMATIC" full power-shift transmission; 3-speed, fully reversing, constant mesh, countershaft type with balanced, rotating, hydraulic clutches continuously pressure-filled, cooled and lubricated.

This sintered friction plate, OD 5 3/4 in., is used in an oil-immersed application in "PAYLOMATIC" transmissions. The number of plates and the ratios vary between the models to meet torque requirements.



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CALENDAR

OF COMING SHOWS AND MEETINGS

- The Society of the Plastic Industries, Inc., 16th Reinforced Plastic Div. Conference, ChicagoFeb. 7-9
- American Foundrymen's Society, Wisconsin Regional Conference, MilwaukeeFeb. 9-10
- The Aluminum Association, Annual Meeting, ClevelandFeb. 15-17
- Malleable Founders Society, Semi-Annual Meeting, Cleveland..Mar. 1-2
- American Society of Mechanical Engineers, as Turbine Power Div., Co-Sponsored by the Dept. of Defense, 6th Annual Gas Turbine Conference & Show, Washington, D. C.Mar. 5-9
- Material Handling Institute, Spring Meeting, ChicagoMar. 7-9
- Instrument Society of America, 11th Annual Conference on Instrumentation for the Iron and Steel Industry, Pittsburgh..Mar. 8-10
- The Steel Founders Society of America, Annual Meeting, ChicagoMar. 11-14
- The American Society of Mechanical Engineers, Aviation Conference, Los Angeles.....Mar. 12-16
- American Society for Metals, Western Metal Exposition, Los AngelesMar. 20-24
- 23rd Annual American Power Conference, Sponsored by Six National Engineering Societies, ChicagoMar. 21-23
- Spring Technical Meeting, Pressed Metal Institute, New York..Mar. 22-24
- Instrument Society of America, 3rd Symposium on Temperature, Columbus, OhioMar. 27-31
- Society of Automotive Engineers, National Aeronautic Meeting, New YorkApr. 4-7
- Management Engineering Conference, American Society of Mechanical Engineers, Society for the Advancement of Management, New York CityApr. 6-7
- American Society of Mechanical Engineers, Oil & Gas Power Conference & Exhibit, New OrleansApr. 9-13
- 43rd Anniversary National Truck, Trailer & Equipment Show, Los AngelesApr. 13-15
- American Welding Society, 42nd Annual Convention and Welding Exposition, New York..Apr. 10-21
- American Welding Society, Welding Show, New YorkApr. 18-20
- 18th Annual Western Section Conference, Society of the Plastics Industry, Inc., Coronado, Calif.Apr. 20-21
- 65th American Foundrymen's Society Exposition, San FranciscoMay 8-12
- American Society of Tool & Manufacturing Engineers, 1961 Engineering Conference & Exhibit, New YorkMay 22-26

Observations

By Joseph Geschelin

SAE Show

The availability of the fabulous facilities of Cobo Hall made it possible for the first time to accommodate an almost unlimited number of exhibitors in connection with the SAE Annual Meeting in Detroit. Exhibits were spacious and the generous aisle spaces made it possible for everyone to see the displays in comfort. The AUTOMOTIVE INDUSTRIES booth became a focal point for meeting and greeting many of our friends—both new and old—and we wish to take this opportunity to thank those who came in to exchange greetings with us.

Engine Doings

The press conference on passenger car engines at Cobo Hall during the SAE meeting brought out some interesting things. For one thing, it appears that aluminum engines are doing well not only in production but in the field. There were persistent rumors in the press in recent months about troubles with aluminum engines. Evidently the reporters learned for the first time you can't start a new engine program in any plant without encountering production problems. This is not a new phenomenon. Any new equipment, whether it be for an engine block or for a component, frequently requires tuning and adjustment. We know from past experience that some transfer machines and many special machines take as much as 30 days or longer before they are "debugged." But this has nothing to do with the product itself. The fact that factory management had to tune equipment and adjust cutting tools and other details has nothing to do with the behavior of an aluminum engine in a car. We can't expect non-technical people to understand these things. But it would be nice if they recognized their limitations and talked to those who do know before they publish their conclusions to the public.

Engine Progress

At the Cobo Hall press conference we learned some background information. For example, there was the comment that more four-cylinder engines are in the making. Studebaker is doing some experimental work on a four and doubtless so are other passenger car builders. Here is an anomaly. Chrysler presented an extensive paper at the SAE meeting on its aluminum version of the slant Six. Despite this the corporation was not talking for publication.

The explanation for this is that the aluminum version is still made in small numbers and is being introduced in a number of cars on a sampling basis. At this writing it is not possible for a car buyer to request an aluminum engine and be sure of getting it. On the other hand, you may well buy a car with a 225-cu-in. engine and find it is aluminum.

Unorthodox Power Plants

Panel discussion at the SAE Annual Meeting brought out the point that an unorthodox engine such as the NSU-Wankle rotating design is viewed with some skepticism and gets into the province of the experimental laboratories rather than in product engineering departments. It takes a lot of testing and road work to prove out the claims for a radical design. A word on gas turbines. Gas turbine designs still have a long way to go, although considerable progress has been made in recent years. Best guess is that the gas turbine, if and when it becomes commercial, will be slanted at heavy duty commercial vehicles rather than passenger cars. The Army is very much interested in gas turbines and is currently experimenting with all known makes of domestic origin. This work—and it is serious—may well advance the art and aid in commercial exploitation.

Bonded, rivetless, aluminum-cored structure of the Douglas A4D Skyhawk's rudder section prevents skin-crack failures. Conventional riveted structure could not stand pre-service load and vibration tests. Sonic flight vibration would have caused cracks between rivets on skin.



Photo courtesy Douglas Aircraft Company, Inc.

11 Ways Ray-BOND Adhesives Solve Tough Fastening Problems

New bonding and laminating techniques at R/M help solve difficult fastening problems and thereby make possible many of the new products being developed and produced by America's advancing technology. The advantages of Ray-BOND adhesives include:

- Rivets can be eliminated • Members too thin to rivet can be joined and fixed • Manufacturing costs are reduced • Life of wearing surfaces is extended • Heat conductivity is improved • Weight reduction is substantial • Load is uniformly distributed over joint area • Bond produces residual elasticity • Complex shapes can be easily fabricated • Electrical non-conductivity and protection against corrosion can be achieved • Methods of application are fast, economical, flexible

Counsel and detailed technical information regarding the selection and application of adhesives are freely available to you from Raybestos-Manhattan. An R/M representative can call on you promptly to discuss your requirements.

MAIL COUPON FOR FREE BULLETIN

R/M	RAYBESTOS-MANHATTAN, INC.
	Adhesives Dept., Bridgeport, Conn.
Please send me a free copy of your new technical Bulletin No. 701.	
Name _____	Title _____
Firm _____	
Address _____	
City _____	State _____

Circle 109 on Inquiry Card for more data

udylite

research 'punch' breaks
through the semi-bright
nickel plating barrier!



corporation



BRAND NEW PROCESS is easier to operate and control, provides better uniformity of color and greater production efficiency than ever before!

here's why:

NO HARMFUL BREAKDOWN PRODUCTS. There are no harmful materials formed from the N2E addition agents as a result of the plating process! Thus, batch treatment is necessary only when contaminants from other sources enter the bath and continuous carbon filtration will not remove them. The result is a substantial saving in solution, downtime, manhours and additional chemicals ordinarily required to treat and rebuild the plating bath.

CONSISTENT UNIFORMITY. N2E addition agents are noncritical in concentration. Reasonable variations from recommended concentrations will not seriously affect the characteristics of the deposit. Overall uniformity of color is maintained. Even in deep recesses on the backs of intricate die castings, amazingly clean deposits are obtained.

WIDE CURRENT DENSITY RANGE. N2E's average current density range is 30 to 60 amperes per square foot, with a considerably higher limiting current density. This wide range permits faster plating at a higher average current density without burning.

GREATER TOLERANCE TO METALLIC IMPURITIES. The absence of harmful breakdown products is of special importance in con-

nection with metallic contaminants, since the undesirable effects of the two are cumulative. Another N2E 'plus' factor that helps maintain uniformity and quality.

ADHESION GREATLY IMPROVED. Production experience over a considerable period of time has conclusively demonstrated the excellent adhesion characteristics of Udylite N2E in combination with the Incomparable '66' Bright Nickel Process.

ECONOMICAL CONTINUOUS FILTRATION. One of the outstanding advantages of N2E is the fact that the bath can be continuously filtered through an activated carbon pack without appreciable loss of brighteners. The cleaning action of the continuous carbon filtration permits long periods of uniform, high quality production. The stability of N2E addition agents also permits economical bath purification by low current density electrolysis.

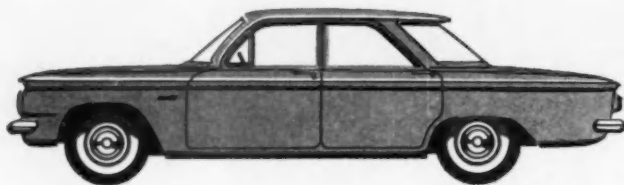
CAN BE ADDED DIRECTLY TO BATH. N2E addition agents are liquid and can be added directly to the bath without the use of filters. For high-speed operation, air agitation of the bath is recommended, although N2E performs well with mechanical agitation and can even be used without agitation.

See for yourself what N2E can do to improve your plating operation. Submit one of your problem parts for test plating now. See your Udylite representative. Or, write or phone:

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CHEVROLET CORVAIR

NEW SMALLER-SIZE CARS...GIANT-SIZE PERFORMANCE

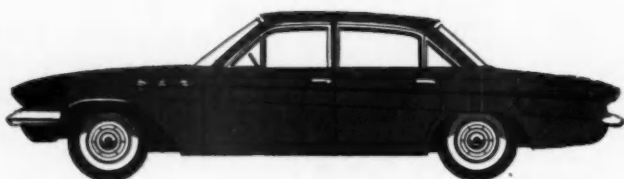
...and Rochester-GM Carburetors deliver tailor-made economy and performance

Each of the newer-size General Motors cars has a power personality all its own. And Rochester-GM Carburetors have been individually designed and developed to fit the exact requirements of each car's engine. That means maximum performance and economy.

The success of this tremendous job was made possible through GM Reliability . . . the system of checks and counter-checks that becomes a vital part of each step in the development and manufacture of Rochester-GM Carburetors. Before these carburetors were released, they were subjected to thousands of torture-loaded miles . . . in the plant, on the GM Proving Grounds, and on the road . . . to insure their complete reliability.

Even now, field men are following through, sending back pertinent information that is immediately incorporated into current plans. The result: a carburetor that performs its job when it's asked to perform and for as long as it's expected to perform.

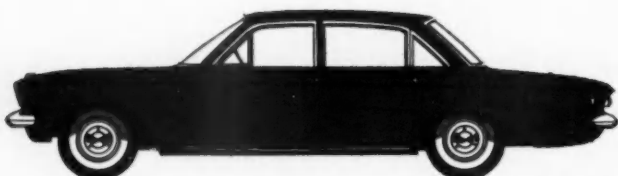
Rochester Products Division, General Motors Corporation, Rochester, New York.



BUICK SPECIAL



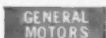
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carburetors

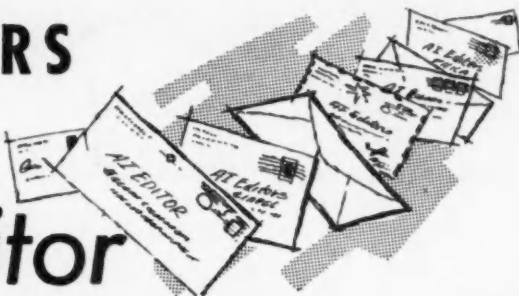
ROCHESTER CARBURETORS

GENERAL MOTORS

LETTERS

to the

Editor



Readers' opinions or requests for additional information on material appearing in the editorial pages of AUTOMOTIVE INDUSTRIES are invited for this column. No unsigned letters will be considered, but names will be withheld on request. Address *Letters to the Editor*, AUTOMOTIVE INDUSTRIES, 56th & Chestnut Sts., Philadelphia 39, Pa.

RADIOISOTOPES

We have had considerable interest in the article which appeared in AUTOMOTIVE INDUSTRIES in the last year (Radioisotopes Advance in Automotive Engineering). As a matter of fact, yesterday I received a call from Dr. Paul J. Blaettus, Chief Isotope Technology Branch, Office of Isotope Development, U. S. Atomic Energy Commission in Washington, D. C.

Dr. Blaettus requested 12 reprints of the article apparently for use in isotopes conference to be held on the west coast late this month. We have entirely exhausted our supply and I hoped that you would be able to supply the A.E.C. with this material.

Incidentally, everyone in Washington that I have talked to recently has mentioned the article and has seemed quite impressed with it. We too, have been very impressed with the number of inquiries we have received from news releases of ours you were kind enough to publish.

A. J. Stevens, President
Radionics Inc.
Norristown, Pa.

● Reprints are on the way.—
Ed.

HARDNESS TEST

From your article entitled "Mechanized Foundry for Shell-Cast Pontiac Crankshafts," we learned the name of the firm manufacturing the Cogan Brinell automatic hardness testing machines for crankshafts. Unfortunately, no address of the firm has been given.

As we are anxious to acquire more details about the above mentioned testing machine, we should request you to kindly let us know

the firm's address so that we may apply to them for further details. Or may we ask you the favor of addressing the firm directly requesting them to let us have literature describing their products?

Literature Research Dept.
Autobrzdy n. p.
Gottwaldova 100
Jablonec nad Nisou
Czechoslovakia

● We think you are probably referring to Gogan Machine Corp., 1440 East 55th Street, Cleveland 14, Ohio.—Ed.

TEMPEST DRIVESHAFT

I was very interested in your article "Unique Production Methods for Pontiac Tempest Driveshaft" which appeared in a recent issue of AUTOMOTIVE INDUSTRIES, and would like to use it as a topic for a study on vibration analysis.

Since I have been unable to find any information on this problem, I thought you might be of some help.

● The source is always the best. Suggest you contact Mr. Bob Emerick, Director of Public Relations at Pontiac Motor Division, Pontiac, Mich.—Ed.

CAIN'S MARK

I read with real appreciation your comments under the heading of "Cain's Mark" in the December 15 issue.

I am sure this will be noted by many others in the industry and perhaps in the journals which editorialized in such an ill-informed fashion about vehicle safety design.

W. F. Sherman, Manager
Engineering & Technical Dept.
Automobile Manufacturers
Association
Detroit, Mich.

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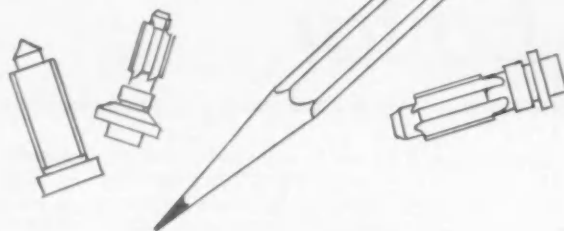
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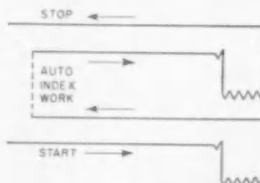
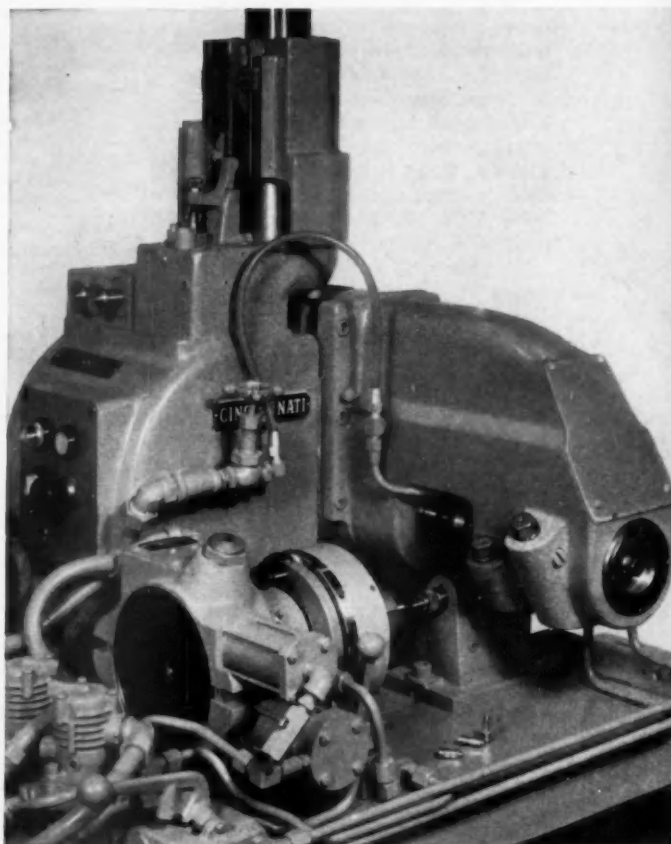
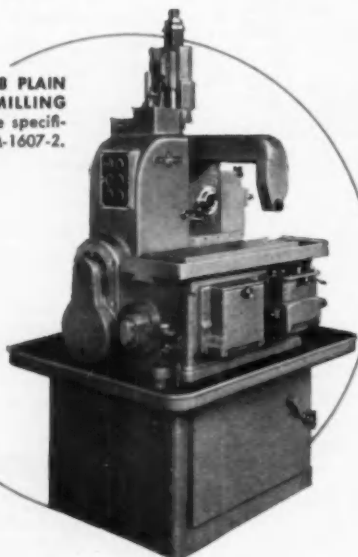


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Milling 4 slots or flats 90° apart on small valve parts presented a real challenge in cost reduction. Cincinnati Engineering Specialists tooled up a CINCINNATI O-8 Automatic Rise and Fall Milling Machine, with a duplex head to mill two surfaces simultaneously; and with an air-operated indexing fixture to perform two milling operations in one cycle without work handling. The result: **4 surfaces milled automatically in one continuous cycle, at a production rate of 139 to 150 per hour.**

Are rising costs putting the squeeze on *your* profits? Cincinnati Engineering Specialists are experts in solving such problems with the aid of modern methods and new machines, such as CINCINNATI 000-4, 1-18 Automatics, the O-8 described here, and the HyPowermatics. Send us your blueprints and data on problem components. Write today for complete details. **Milling Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

CINCINNATI No. O-8 PLAIN RISE AND FALL MILLING MACHINE. Complete specifications in catalog M-1607-2.

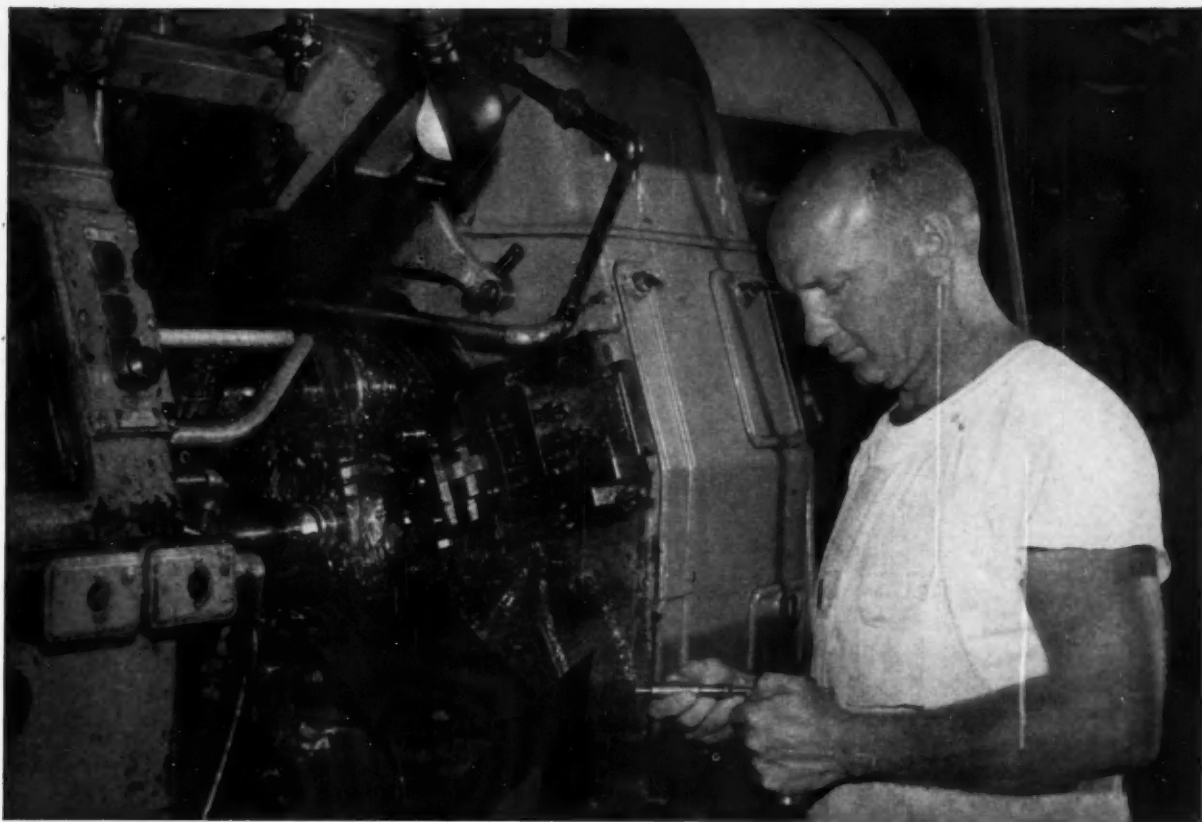


TWO OPERATIONS are performed in one cycle on this CINCINNATI O-8 Plain Rise and Fall Milling Machine, automatically milling 4 surfaces on small valves. Special tooling includes duplex head and air-operated indexing fixtures.

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• CUTTER AND TOOL GRINDERS • ELECTRICAL DISCHARGE MACHINES



Manufacturer increases tool life 20% with **CLEARTEX**

—saves \$100 monthly on oil alone!

The Master Vibrator Company of Dayton, Ohio—maker of portable heaters, cement finishers and other contractor equipment—was having trouble with lube oil diluting the cutting oil on their automatic screw machines. There were too many tool regrinds and too many rejects. A Texaco Metalworking Engineer suggested a test of Cleartex. They agreed to using a 10 gallon sample on one automatic. That was November, 1959.

In one month they were convinced. By using Cleartex on both cutting and lube sides they solved their problem—no more dilution of cutting oil. And look at the results: Tool life increased 20%; actual monthly savings on oil of \$100; less carry-off on chips; cleaner machines; fewer rejects; happier operators and delighted management! No wonder they switched entirely to Cleartex and are now regular users of 10 drums a month!

Why not send for your copy of Texaco's new booklet—"Cleartex in Automatic Screw Machines." This illustrated guide will show you how to end dilution of cutting oil—and the profit-draining costs in rejects and tool life it causes. Just mail the coupon. Or if you want immediate

savings, ask to have a Texaco Metalworking Engineer set up a test in your plant—on one machine, or on your whole line.

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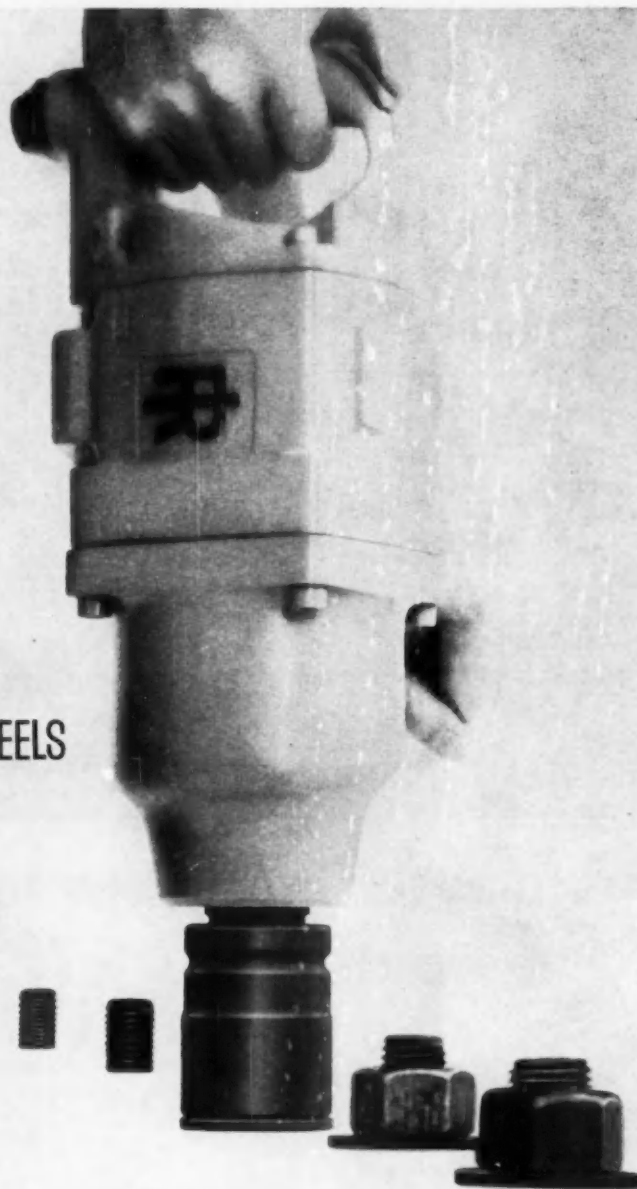
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NEWS

Vol. 124, No. 3

Feb. 1, 1961

Wall St. Performance Forecasts Strong Year

By Hartley W. Barclay, Editor and Publisher,
and C. B. Campbell, News Editor

The strong upward trend of automotive stocks mid-way through the first quarter of 1961 forecasts a strong automotive year, analysis of 31 market leaders reveals. Continuing the analysis of publicly-held securities reported on previously in this magazine, the comparison of market prices for automotive common stocks shows that these issues reflected the following aspects:

1. Analyzed issues have shown a strong upward trend since mid-December.
2. Declines below December levels have been fractional, except for one issue.
3. Advances have been general throughout the entire list.
4. Percentages of net gain during the period exceed the popular expectation of industry suppliers.
5. The strong gains might well be construed as reflecting the high level of confidence that the public and investors have in the economic performance of the entire industry in 1961.

In a recapitulation of the gains made since December, one company gained more than \$10 per share; three gained more than \$7 per share; three gained more than \$5 per share; 10 gained more than \$2 and three more than \$1.

This performance is all the more spectacular in view of the numerous prognostications of popular economists that a major downtrend was to be expected for the automotive field in 1961.

Sharply at Variance

The economists predicted an outlook that was sharply at variance with the forecasts of the major automotive and supplier industry executives. It now seems the public and the investment groups generally have accepted the outlook predictions of the automotive industry leaders.

The listings used for the analysis consist of the nine primary automotive vehicle producers plus 22 primary automotive parts producers. The position of these securities reflects itself in a baro-

metric manner, according to trends of the Automotive Industries series. In brief, they tended to decline in advance of the low earnings periods of the late fall of 1960. The current advance seems to portend improved economic outlook compared with the position of the industry during the last quarter of 1960.

Farm Outlook Good

The 1961 outlook for an allied industry, farm machinery and equipment, also appears bright, Federal experts declared.

The trend toward larger farms has the added effect of increasing sales of larger farm machines and equipment, so that dollar expenditures for the same number of units is expected to be higher this year.

A further factor to consider this year is the replacement market. Sales of machinery and equipment, especially tractors, were unusually heavy during the late 1940s. Much of this equipment is now obsolete, and must be replaced. Farmers, in order to be competitive cost-wise, are finding it necessary to offset increased labor costs by using larger and more efficient machinery.

Considering the various factors influencing the sale of farm machinery and equipment, industry sources believe production should increase moderately over 1960.

Gordon's Challenges

What could have been just another "banquet speech" at the Society of Automotive Engineers annual dinner turned out to be an eyebrow-raising thought-provoker that kept the 1800 dinner guests awake and listening.

John F. Gordon, president of General Motors, delivered the address. By the time he was through Mr. Gordon had challenged directly or indirectly, foreign competition, European quality of workmanship, George Romney, the compact car, the UAW, and self-styled critics of the automobile industry.

Here are some highlights of the address:

On foreign competition: "We have no cause to be complacent. Imports still account for a sizable segment of our market; 400,000 to 500,000 units certainly are not to be sneezed at."

On foreign quality: "It is high time for us to Scotch forever the

myth of European superiority in product quality. Most European manufacturers today use the same assembly line techniques we do."

On George Romney (although Mr. Gordon did not mention the American Motors president by name, the implication was there): "The charge has been made that the U. S. automobile industry is meeting this (foreign) challenge by sidestepping it—by abdicating its leadership position and moving abroad. We are accused of going international. I, for one, resent this charge. The U. S. automobile industry is not abdicating its leadership."

On compact cars: "The American consumer has a mind of his own. . . Personally, I have the feeling that he is going to find out in due course that the standard size American cars are the most useful to him and offer the greatest value for his dollars."

On automation: "We must step

up productivity. Professor Bright (J. R. Bright, Harvard Business Review) urges—and rightly, in my opinion—'A far more aggressive program of economic activity.' Increased mechanization—or automation—if you prefer that word—is imperative."

Jeeps in Nigeria

Jeep vehicles are being produced in Lagos, Nigeria, by United Africa Motors under a license agreement with Willys Overseas, S. A. The Nigerian firm, which opened a 40,000 sq ft plant in June, 1959, is assembling the Jeep utility wagon and two models of the Jeep Universal. Components are shipped from the Willys plant in Toledo, O.

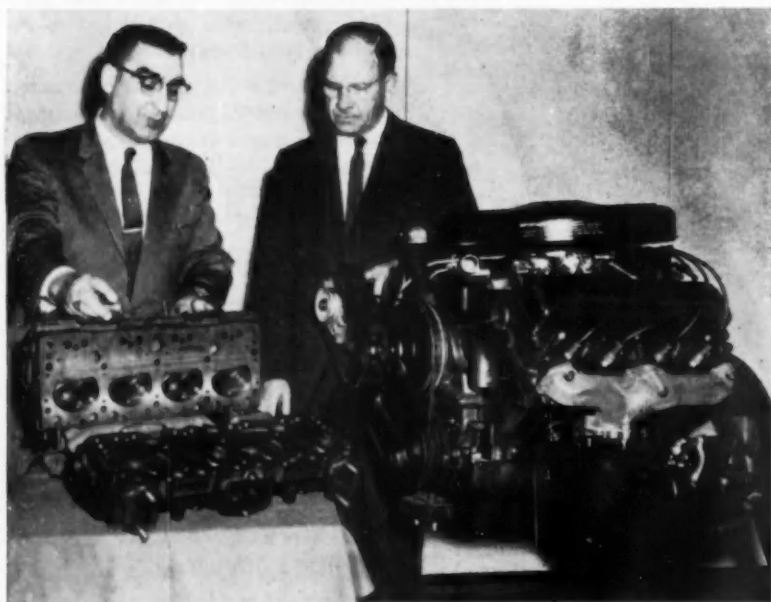
United Africa Motors Ltd., is a wholly - owned subsidiary of the United Africa Co., Ltd. of London, and Willys Overseas, located in Zug, Switzerland, is a subsidiary of the parent Toledo firm. The Nigerian operation is the 23rd overseas plant producing Willys.

Lancer Sports Coupe

Dodge has introduced a low-priced two-door sports coupe in the Lancer 770 series. The new model, already in production, features special interior treatment and a second color exterior beltline emphasized by a narrow chrome strip. Standard engine is the 170 cu. in. slant six.

The new 770 sports coupe, a five-passenger model, carries a factory retail price of \$1895, \$57 to \$346 lower than other Lancer 770 models. Previously, Dodge offered a sports coupe only in the 170 series.

GM ENGINE AIDS PETROLEUM RESEARCH



This 371 cu in. V-8 engine from General Motors Engineering Staff is now available to petroleum industry researchers for testing high octane experimental fuels. With interchangeable heads, it can operate at 10-1, 12-1 and 15-1 compression ratios. Darl F. Caris (right), engineer in charge of Power Development, and his assistant, B. J. Mitchell, examine new engine.

NEWS

CONTINUED

Newberg, Minor Sue

The Chrysler Corp. has been handed three more law suits, two of which involve profits in one way or another.

When William C. Newberg stepped down as president, last summer, he said he was going to spend some time fishing and hunting. But, as it turned out, he was busy conferring with his attorneys.

Mr. Newberg filed suit against Chrysler last month, charging that he was the scapegoat to cover up "misconduct, maladministration, incompetence, waste, neglect, breaches of duty and selfdealing" during the administration of L. L. Colbert, board chairman and president.

Specifically, Mr. Newberg's suit asks to set aside an agreement made by him last July to pay Chrysler \$455,000. Chrysler said the money represented profits made by Mr. Newberg through his interest in two firms supplying parts to Chrysler.

Jack Minor, former marketing director for Plymouth-De Soto-Valiant Div., filed two separate suits, one for \$23,000 and a second for \$200,000. The first is for a loss he said he suffered through contributions to a stock ownership plan. The second suit alleges that Chrysler damaged his reputation, earning power and job chances in forcing him to resign.

Chrysler said Mr. Newberg's suit is without foundation in fact and the Minor suits are not justified by facts. In the case of Mr. Newberg, there is a difference of opinion on who suggested the \$455,000 settlement. Chrysler claims it was Mr.

Newberg's idea, while he maintains it was suggested by Mr. Colbert and four others, three of them directors.

There currently are eight law suits pending, all of which grew out of the "conflict of interest" charges. Chrysler is plaintiff in two cases and defendant in six.

Chevy Walk-In Truck

Chevrolet has introduced a new half-ton walk-in delivery truck and a heavy-duty reinforced chassis at the opposite end of the weight scale.

The delivery van, called the "Step-Van 7," has a 1350 lb payload capacity in a seven ft body with 211 cu ft of load space. The truck has a 102 in. wheelbase and 167 in. overall length. Power comes

from Chevy's 135 hp six.

The Step-Van 7 has independent front suspension and coil springs.

The heavy-duty chassis is designed for off-the-highway operations such as logging, pit mining and dump work. A. T. Olson, Chevrolet national truck manager, says the new option offers what many off-road operators install piecemeal on conventional trucks to beef them up.

The reinforced chassis is available for two- and two and one-half ton models of 157 and 175 in. wheelbase. The option includes heavier gauge side rails and inner lines, full-length reinforcement, and an alligator jaw type cross-member in place of the conventional X center member. Also included are add-strength cross members at the spring hangers, and heavy-duty suspension and springs.



Chevrolet's New Step-Van 7

NEWS

CONTINUED

I-H Utility Vehicle

The Scout, a new, small all-purpose vehicle has been introduced by the Motor Truck Div. of International Harvester Co.

It is offered in two-wheel or four-wheel drive models, including a three-person passenger compartment with removable steel top, five ft-long pickup body, fold-down windshield, removable door glass, removable doors and a new International Comanche four-cylinder engine as standard equipment. A full-length one-piece steel Travel-Top, that encloses both driver compartment and body, is optional.

"The Scout represents a new concept in automotive versatility," D. F. Kuntz, division sales manager declared. "It can quickly and easily be converted from a completely enclosed passenger run-about, small pickup or panel truck to an open model without top, windows or doors."

Styling of the new model features a loaded overall height of 67 in. for the two-wheel drive mod-

el. Overall length is 12 ft, 10 in. The wheelbase is 100 in.

The Comanche engine, a 152-cu in., four-cylinder valve-in-head power plant, develops approximately 90 hp at 4400 rpm.

300 Electric Vehicles

The Post Office Dept. has ordered 300 electric powered three-wheeled vehicles for delivery of mail in suburban areas from Highway Products, Kent, O.

The "Mailster," as the vehicle is known, has been tested in Miami, Fla., and Houston, Tex. Maintenance costs have been reduced, postal officials claim, while at the same time the electric vehicles have 62 per cent more cargo space.

Special's Power-Pack

Buick is offering a power-pack that will beef up the aluminum V-8 engine in the Special from 155 to 185 hp. The optional kit includes

a four-barrel carburetor, cam changes and other modifications. Compression ratio is increased from 8.8 to 10.25 to 1.

The power-pack is available with either automatic or standard transmission. Buick joins other compact makers in providing the means to step up performance at the sacrifice of economy. Although the power-packs have not been big sellers, they are available to the economy car buyer who does not want economy.

\$3 Million Contract

Studebaker-Packard Corp. has been awarded a \$3,117,847 contract to supply passenger cars to the General Services Administration.

The GSA contract, covering more than 2000 six and eight cylinder Larks, is the largest single order of standard production vehicles ever contracted for by the company.

L. E. Minkel, vice president of marketing, said the contract was awarded on the basis of competitive bidding for the annual passenger car requirements of governmental agencies throughout the nation. Last year S-P was awarded a \$717,945 contract to supply the Federal government 491 passenger cars.

New Euclid Scraper

A new overhung engine type scraper of 24 yd. struck capacity and 80,000 lbs payload has been added to the line of self-powered scrapers made by Euclid Div. of General Motors Corp.

Powered by a General Motors 12 V-71 engine of 432 hp, the scraper has nine speed and power combinations. Wheelbase is 27 ft seven in. and overall length is 42 ft four in. Net weight is 70,000 lbs.

Pressed Metal Officers

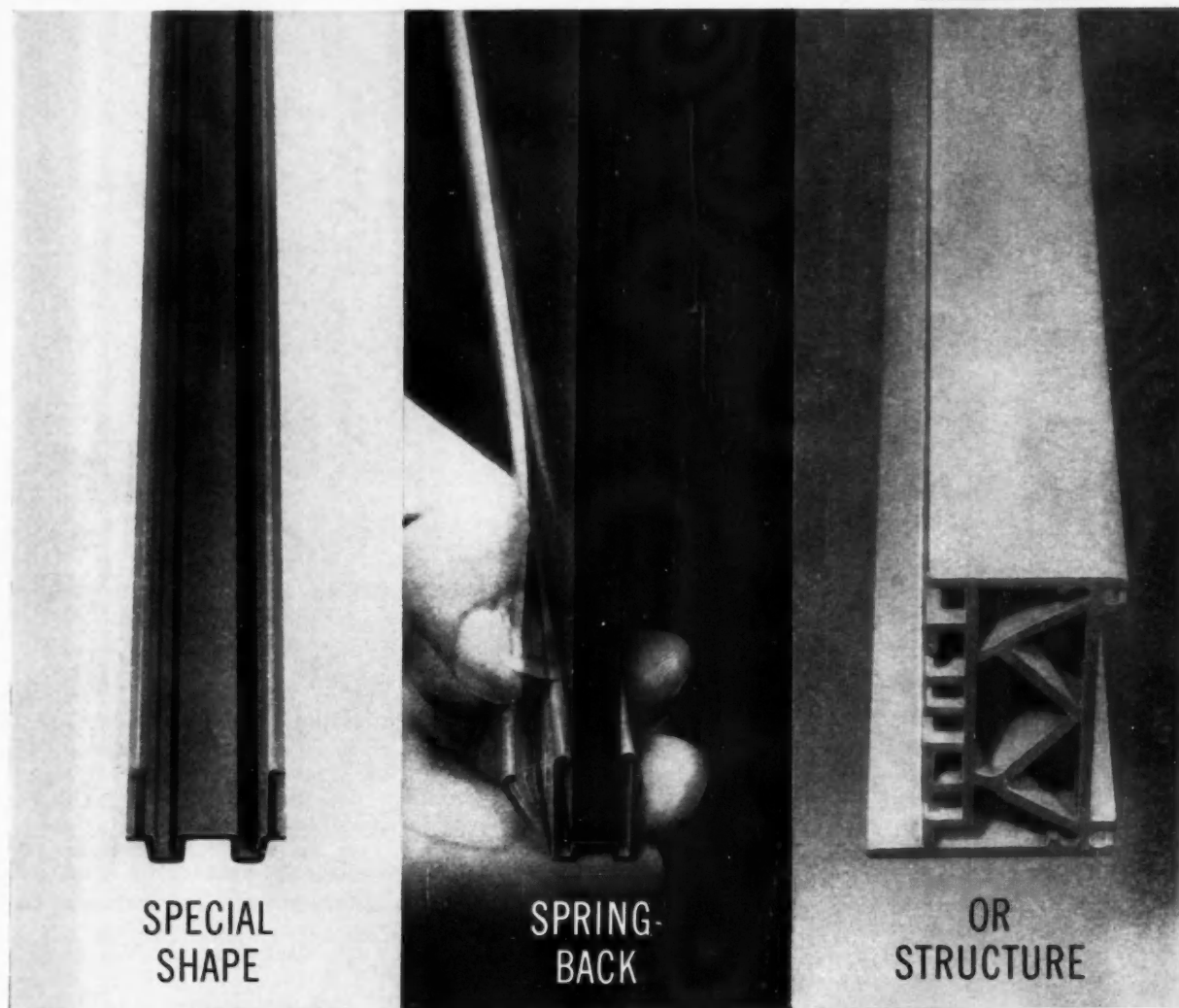
M. A. Sherwood, Grand Haven Stamped Products Co., Grand Haven, Mich., has been elected president of the Pressed Metal Institute.



International Harvester's New All-Purpose Scout

Each of these extrusions of rigid Geon by Crane Plastics, Inc., Columbus, Ohio, is in use for various architectural applications—chiefly windows. B.F. Goodrich Chemical Company supplies the rigid Geon vinyl.

B.F. Goodrich



Look how you can solve design problems with extrusions of rigid GEON vinyl

These extrusions show how the properties of rigid Geon lend themselves to solving different design problems. The special shapes show how detail can be reproduced—and it is easy to produce a long, smooth part, *straight* out of the die.

Other extrusions demonstrate how the springiness of thinner-walled extrusions gives you a spring-back characteristic for weather-stripping or rattle-proofing applications. Still others show the structural possibilities—how rigid Geon provides load-carrying strength without weight.

At the same time, each extrusion brings you all the other advantages of vinyl—unusual abrasion resistance, resistance to chemicals, self-extinguishing properties and electrical advantages. In every case there's the opportunity to mold color right in.

How can these extrusions solve your problems? We'd be glad to help you answer this question. Write Department NP-1, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio.
In Canada: Kitchener, Ontario.

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Live Action takes the risk out of fastenings. Shakeproof's exclusive 3-way combination of multi-toothed line bite . . . built-in spring reaction that holds harder under stress . . . and bracing strut action—rigidly opposes loosening—assures a permanent fastening.

Test-after-test proves Shakeproof Live Action locking superiority. You can prove it, too! Order a Shakeproof Sample Kit—we'll send you a selection of Shakeproof Lock Washers to test as you see fit.

Don't pussyfoot. . . make tracks to Shakeproof for the lock washer that never compromises your product's reputation.



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NEWS

FEATURES

SAE's Record Parley

Week-Long Sessions Attract 25,800

Planners of the recent International Congress and Exposition of Automotive Engineering in Detroit's Cobo Hall optimistically predicted a registration of 15,000. They probably would have settled for something less, but they didn't have to. Official and final registration figures from the Society of Automotive Engineers showed 25,800 foreign and domestic visitors.

The week-long meeting, which deserved to be labeled "biggest ever," combined the annual meeting of the SAE with an all-out effort to attract engineers from around the world, both as participants and guests. The results were more than gratifying to SAE officials. Nearly 100 foreign visitors checked in, and more than a score of papers were presented by representatives of Canada, England, France, Germany, Japan, Spain, Italy, Holland and Sweden.

180 Papers Presented

In all, some 180 papers were presented during the week.

A visitor had to be truly selective in determining what papers he wanted to hear, with as many as eight simultaneous sessions competing in Cobo Hall meeting rooms. But the range of topics provided enough variety to balance the crowds. The largest

single meeting, in fact, was a student session where A. Scott Crossfield, chief test pilot and design engineer at North American Aviation's Los Angeles Div., discussed the X-15 flight test program.

The meeting in reality was a three-in-one package, combining the SAE annual meeting, the international gathering, and a 200,000 sq ft exposition that gave the exhibitors virtually all the space they could use. For the first time, companies were able to set up their booths with ample room to move around. SAE hopes to duplicate the exhibit section again next year.

18 Special Sessions

In general, the overseas visitors were well satisfied with their Detroit trek—the usual camera clicking was a common sound. There were 18 special international sessions scattered throughout the week, and an international luncheon with Paul G. Hoffman, former Studebaker president and board chairman, as guest speaker. Mr. Hoffman now is managing director of the United Nations Special Fund.

The annual banquet, with 1800 trenchermen, was the largest ever at an SAE meeting. General Motors President John F. Gordon,

banquet speaker, used the occasion to touch on every subject from foreign competition to automation and small cars.

Although the technical papers were not all technical, and covered a range of topics that would have astounded the founders of SAE, the bulk of the sessions were extremely educational and revealing. The one-time criticism of SAE—a bunch of engineers telling each other things they already know—is no longer valid. With such a choice of technical sessions and papers, the engineer was bound to hit on something completely new and useful to him.

Emphasis was on motive power. Tuesday and Thursday evening sessions, planned not to conflict with other meetings, covered the rotary combustion engine and the new engines for 1961 passenger cars. Other well-attended sessions included papers on ground effect machines, fuel cells, military vehicles, and "Project Moonbeam." The latter was a nine-paper, all-day session that touched on all aspects of a hypothetical 10,000 lb payload moon vehicle.

New York Auto Show

The fifth International Automobile Show will be held in New York's Coliseum from April 1 to April 9.

Displays of new automotive styling, engineering, motor scooters and accessories will utilize three floors of the Coliseum. Last year, 311 models were exhibited by 81 manufacturers.

AI TABLOID

The electronic equipment reliability handbook used by the Air Force's ground electronic equipment research and development center at Rome, N. Y., has been made available to industry through the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce.

Merchandise exports neared an annual rate of \$20 billion and imports approximated \$15 billion in the third quarter after allowing for seasonal factors. This favorable trade balance, however, was more than offset by other transactions resulting in net transfer of gold and liquid dollar assets to other countries at a seasonally-adjustable annual rate of \$4.3 billion. This compares with \$2.9 billion in the second quarter.

Outlays for new construction are expected to rise four per cent to a record \$57.3 billion in 1961. This would surpass the 1959 peak of \$56.2 billion.

A new type of carbon paper that "regenerates" itself after each use is being welcomed by secretaries and typists. Made by the Columbia Ribbon and Carbon Manufacturing Co., Inc., it introduces a new principle in duplication. It has a porous surface and as soon as the typewriter key leaves the paper, ink from other areas of the sheet flows through the pores to refill the color void on the duplicating sheet.

A new family of commercial chemicals, metal alcohols, promises to be useful in the plastic, paint, food, cosmetic, drug and other industries.

Nine translations of foreign technical literature on metals have been released to industry and the public through the Office of Technical Services, Business and Defense Administration, U. S. Department of Commerce.

A bibliography of physical equilibria and related properties of cryogenic systems is one of four technical research reports prepared by the National Bureau of Standards. They have been released to industry and the public through the Office of Technical Services, Business and Defense Administration, U. S. Department of Commerce.

Personal income in October was at an annual rate of \$409.5 billion, up slightly from both September and the third quarter average of \$408 billion. For the first 10 months personal income was at a \$403.5 billion annual rate, \$22 billion higher than in 1959.

Small firms have been awarded 8121 prime government contracts valued at \$342.5 million under the Small Business Administration's procurement program during the period July through October, 1960. This is an increase of \$81.5 million in contracts over the same 1959 period.

Nine translations of foreign literature on automation, assembly line production, and other aspects of mechanical and civil engineering have been released for sale to industry and the public through the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce.

Consumption of new rubber in the U. S. amounted to 122,144 long tons in November, 1960, compared to 125,817 tons in October, 1960.

The third edition of a directory of military agencies responsible for the development of missile ground support equipment has been compiled by the Department of Defense. It is for sale to industry and the public by the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce.



Sherrod E. Skinner

Skinner Heads Drive

Sherrod E. Skinner, executive vice president of General Motors Corp., has been named chairman of the \$8.3 million Science Center Fund of Rensselaer Polytechnic Institute.

Construction of the Science Center's first two buildings is under way and dedication is scheduled for May, 1961. Subscriptions to date total \$2.2 million.

Mr. Skinner, a life trustee of Rensselaer, received the honorary degree of Doctor of Engineering from his alma mater last June.

Additional Duties

Brig. Gen. John F. Thorlin, commander of the Ordnance Tank-Automotive Command, Detroit, also has been named executive director of the Military Automotive Supply Agency, Detroit.

The Army, under a new set-up, will provide the Navy, Air Force and Marine Corps with military automotive supplies. These include vehicular repair parts, tires and tubes, engine components, etc.

New Management Setup at Ford Motor Company

A few days after this story was written, Theodore O. Yntema, (see the cover photo), a former educator, was named chairman of the Finance Committee. He replaces Ernest R. Breech, former board chairman, who resigned to devote more time to personal affairs and other interests.

Arjay R. Miller, vice president and controller, has been appointed vice president-finance, succeeding Mr. Yntema.

J. Edward Lundy, formerly treasurer, was elected vice president and controller. Richard L. Johnson, formerly an assistant treasurer, was promoted to treasurer.

In addition to serving as Finance Committee chairman and a director, Mr. Yntema will continue as a vice president and chairman of the boards of Ford Motor Credit Co. and American Road Insurance Co., both Ford subsidiaries.

SOME recent changes in names and titles, as well as some realignment of Line Groups and their responsibilities, make it profitable to take a fresh look at the management organization of Ford Motor Co.

For some time the top management team has been aligned in two major groups: the Staff vice-presidents—finance, legal, industrial relations, product planning and styling, engineering and research, manufacturing, marketing, public relations, and purchasing; and the vice-presidents of the five Line Groups. At the present writing, since Henry Ford II has resumed once more the duties of chairman of the Board as well as president, both groups of vice-presidents report directly to him.

Despite some changes in responsibility in several of the Line Groups there has been no change in organizational philosophy except in the case of the 17 assembly plants operated by the company. Prior to the year-end change all of the plants had been operated by the Ford Division. Under the new setup all of the assembly plants have been grouped into a separate Automotive Assembly Division, headed by Denis J. Bracken as general manager. Spread over 12 states, this new division handles the assembly of the entire Ford car and truck line—Ford, Falcon, Thunderbird, Lincoln Continental, Mercury, Comet, and Ford trucks.

By
Joseph Geschelin
DETROIT EDITOR

The following is a brief outline of the composition of each of the five Line Groups:

I

GENERAL PRODUCTS GROUP

Irving A. Duffy, Vice-President

HARDWARE AND ACCESSORIES DIVISION

Sandusky Plant, Ypsilanti Plant, Rawsonville Plant, Brooklyn Plant, Paint and Chemical Products Plants in Highland Park, and Mt Clemens, Mich.

STEEL DIVISION

Dearborn

GLASS DIVISION

with plants in Dearborn and Nashville

MANUFACTURING SERVICES (Dearborn Area)

TRACTOR AND IMPLEMENT DIVISION (Birmingham, Michigan)

Tractor Plant (Highland Park, Mich.)
Des Moines Implement Plant
Des Moines Parts Depot
Royal Oak, Mich., Equipment Plant

II

STAMPING AND POWER TRAIN GROUP

C. H. Patterson, Vice-President

ENGINE AND FOUNDRY DIVISION

Cleveland Engine Plants No. 1 and 2
Lima Engine Plant



Henry Ford II, President
Ford Motor Co.

Dearborn Engine Plant
Northville Valve Plant, Dearborn Radiators, Green Island Plant, Dearborn Iron and Specialty Foundries, Cleveland Foundry, Sheffield Aluminum Foundry

TRANSMISSION AND CHASSIS DIVISION

Livonia Plant
Fairfax and Sharonville Plants in Cincinnati area
Dearborn Standard Transmission Plant
Canton Forge Plant
Sterling Plant (Mich.)
Indianapolis Plant

METAL STAMPING DIVISION

Buffalo Stamping Plant
Cleveland Stamping Plant
Chicago Stamping Plant
Dearborn Stamping Plant
Dearborn Frame Plant
Dearborn Tool and Die
Monroe Plant

III

CAR AND TRUCK GROUP

J. O. Wright, Vice-President,
group executive

FORD DIVISION—Lee A. Iacocca, vice-president and general manager
43 Regional and district sales offices
Parts and Accessories Operations
Parts Depots



D. J. Bracken, General Manager, Automotive Assembly Division, Ford Motor Co.



I. A. Duffy, General Products Group, Ford Motor Co.



C. H. Patterson, Vice President, Stamping and Power Train Group, Ford Motor Co.



James O. Wright, Vice President and Group Representative, Car and Truck Divisions, Ford Motor Co.

LINCOLN-MERCURY DIVISION—Ben D. Mills, vice-president and general manager
27 Regional and district sales offices

AUTOMOTIVE ASSEMBLY DIVISION—D. J. Bracken, general manager
17 Assembly Plants across the USA
Ford Quality Control Center
Trim Plant (Highland Park, Mich.)

It may be well to note at this point that the general managers of the Ford and Lincoln-Mercury Divisions now are responsible specifically for marketing, scheduling, and merchandising of their product lines. At one time each one also was in charge of assembly operations. And more recently, the then general manager of the Ford Division

was in charge of all vehicle assembly operations. This is the significance of the current change in organization, incident to the establishment of the Automotive Assembly Division.

IV

FORD INTERNATIONAL GROUP

John S. Bugas, Vice-President

V

DEFENSE PRODUCTS GROUP

Gerald J. Lynch, Vice-President

AERONUTRONIC DIVISION — Newport Beach, Calif., Gerald J. Lynch, general manager
Research Operations
Computer Operations

Weapons Systems Operation
Range System Operations
Space Technology Operations

SPECIAL MILITARY VEHICLES — Frank S. Kipp, general operating manager

We thought it would be of general interest to consider several of the Staff functions that are most pertinent to the design and manufacture of Ford vehicles. First of these is the Manufacturing Staff, headed by John Dykstra, vice-president, manufacturing. This central office activity has the following major responsibilities:

Manufacturing Engineering and Development Office
Quality Control Office

Ben D. Mills, Vice President and General Manager, Lincoln-Mercury Division, Ford Motor Co.

Lee A. Iacocca, Vice President and General Manager, Ford Division, Ford Motor Co.

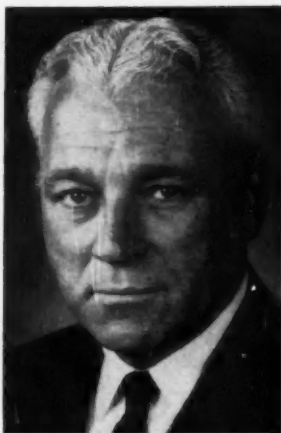
John S. Bugas, Vice President, International Group, Ford Motor Co.

Gerald J. Lynch, Vice President, Defense Products Group, Ford Motor Co.





Frank S. Kipp, General Operations Manager, Special Military Vehicles Operations, Defense Products Group, Ford Motor Co.



John Dykstra, Vice President—Manufacturing, Ford Motor Co.



Andrew A. Kucher, Vice President, Engineering and Research, Ford Motor Co.



Earl G. Ward, Vice President, Purchasing, Ford Motor Co.

Production Programming and Control Office Plant Engineering Office

We mention this activity in particular because each of the divisions as well as most divisional manufacturing plants each has its own Manufacturing Engineering and Plant Engineering Department, each one with a manager responsible to the general manager of the division or the plant as the case may be. In the smaller manufacturing units, where the activity is not as great in numbers, there may be a single manager heading a combined Plant and Manufacturing Engineering department.

Similarly, quality control and re-

liability programs in a manufacturing plant or in a car or truck division are under the jurisdiction of the local general manager.

The point we wish to emphasize is that these plant functions are independent of the Manufacturing Staff operations, although there is a necessary interplay of cooperative effort in the solution of new or advanced projects.

The same thing applies to the Engineering and Research activity headed by Dr. A. A. Kucher, vice-president. Housed in the marvelous new research and engineering center in Dearborn, this activity is concerned with the operation of the Ford proving grounds at Dearborn, Romeo, and Kingman; the operation of research laboratories, scientific laboratories, and related advanced engineering and design programs.

On the other hand, the car divisions as well as other divisions concerned with products such as engines, transmissions, chassis parts, etc., each has its own independent engineering staff and laboratory facilities for the design and development of the particular product. Such engineering facilities are responsible primarily to the general manager of the division. Here too there is a cooperative interchange with the Engineering Staff on special problems.

Another facet of the operation that might be obscure to those outside the Ford organization is that

of Purchasing, headed by E. G. Ward, vice-president. At the present time this is a Staff operation concerned with the buying of all raw materials required for the entire Ford Motor organization. It also has a separate department concerned with the buying of all machine tools, plant equipment, automation devices, etc.

It is noteworthy, however, that the vehicle and manufacturing divisions also operate their own independent purchasing departments. They are concerned with the buying of parts required for cars and trucks, or for sub-assemblies manufactured by the division. ■

D. J. Bastian, Plant Operations Manager, Automotive Assembly Division, Ford Motor Co.

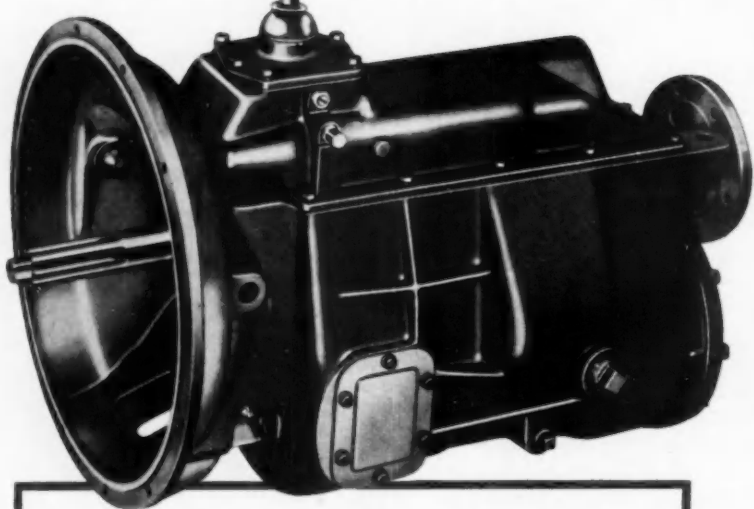


James Knowles, Quality Control Manager, Automotive Assembly Division, Ford Motor Co.



SPICER INTRODUCES NEW TRANSMISSION!

Extra-Heavy-Duty 8000 Series
Direct on 5th



Here is the extra-heavy-duty transmission that truck fleet operators have demanded! The new Spicer 8000 Series 5-speed transmission is the largest capacity direct-on-fifth transmission on the market. It is designed primarily to complement big diesel engines.

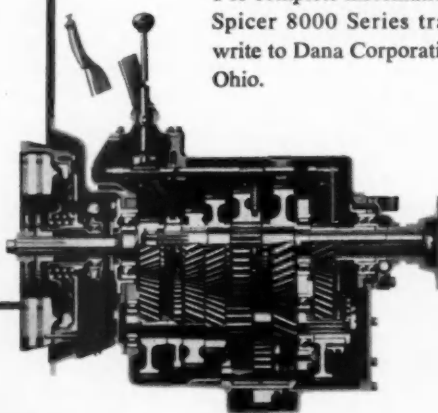
With the new 8000 Series Spicer transmission, top vehicle speed is obtained in direct drive. Ratios of the new transmission are spaced so that they are functionally split or compounded with ratios of 2- and 3-speed axles and 3- and 4-speed auxiliary transmissions. Spicer 14" 2-plate and 15½" 2-plate clutches are matched to work at top efficiency with this new 8000 Series unit.

Ratios in the standard 8052 (iron case) and 8054 (aluminum case) and the optional 8052-A and 8054-A are:

RANGE	STANDARD MODELS 8052 and 8054	OPTIONAL MODELS 8052-A and 8054-A
1st	7.30 to 1	5.68 to 1
2nd	4.54 to 1	3.13 to 1
3rd	2.75 to 1	1.71 to 1
4th	1.65 to 1	1.29 to 1
5th	1.00 to 1 (direct)	1.00 to 1 (direct)
Reverse	7.00 to 1	5.47 to 1

NOTE: The 8031 and 8035 Series Spicer auxiliary transmissions have been augmented by a new underdrive ratio of 1.19 to 1 to better complement the ratios of the new Series 8000 direct-on-fifth transmissions.

For complete information on the new Spicer 8000 Series transmissions, write to Dana Corporation, Toledo 1, Ohio.



DANA
CORPORATION

Toledo 1, Ohio

Many of these products are manufactured in Canada by Hayes Steel Products Limited, Merriton, Ontario

SERVING TRANSPORTATION—Transmissions • Auxiliaries
Universal Joints • Clutches • Propeller Shafts • Power Take-Offs
Torque Converters • Axles • Power-Lok Differentials • Gear
Boxes • Forgings • Stampings • Frames • Railway Drives

MEIN

IN THE NEWS



Muskegon Piston Ring Co., Replacement Div.—Ronald F. Dusenbery has been appointed assistant sales manager.



General Dynamics Corp., Convair Div.—Clyde A. Ford has been named manager of material at Ft. Worth plant.



Kelsey-Hayes Co., Gunite Foundries Div.—William H. Shinn has been named general manager.



Oakite Products, Inc.—Kenneth C. Tucker has been promoted to assistant sales manager.



American Motors Corp.—Otto Kindshoven has been appointed special representative.



Chrysler Corp.—William J. Bird has been promoted to director-fleet sales.

Electric Storage Battery Co.—Dr. Ralph A. Schaefer has been appointed director of research.

Hyster Co.—Dar Johnson, Sr., has been promoted to personnel director.

United States Rubber Co.—Leonard R. Fertig and Raymond J. Mucci have been promoted to assistants to the president.

National Malleable and Steel Castings Co.—Howard W. Brandt has been named vice president and group executive.

Budd Co., Automotive Div.—Rene H. Vansteenkiste has been named research and development engineer.

United States Steel Corp.—James W. Ramsey, Jr., has been promoted to general manager-traffic.

Walker Mfg. Co., Pacific Div.—Dean Lowell has been named national accounts supervisor.

International Harvester Co.—K. M. Banie has been appointed farm equipment consultant.

Ford Motor Co., Lincoln - Mercury Div.—Douglas F. Allison has been promoted to Lincoln Continental marketing manager.

Electric Autolite Co.—Robert Price has been promoted to assistant director of replacement sales.

Chrysler Corp., Dodge Div.—Charles W. Kelley has been promoted to manager of product engineering.

Borg-Warner Corp.—William B. Shimer has been named director of manufacturing services.

White Motor Co., White Truck Div.—D. Brian Wheeler has been promoted to staff assistant to the chief engineer.

Aluminum Co. of America—Howard H. Nuernberger has been promoted to development manager, transportation.

Minneapolis - Moline Co.—Edmund F. Buryan has been named president and chief executive officer and Stacy L. Angle has been promoted to senior vice president.

White Motor Co., White Truck Div.—Harvey F. Dick (far left) has been appointed special equipment engineer, and Mark G. Morris has been appointed chief metallurgist.

Borg-Warner Corp.—Robert L. Myers has been appointed associate director in charge of chemistry and materials at the Roy C. Ingersoll Research Center.

Bendix Corp.—Warren B. Riley has been named director of marketing and commercial product planning.

Gabriel Co., Automotive Div.—Donald G. Bradley has been promoted to purchasing agent.

Tidewater Oil Co.—James D. Willson has been promoted to financial vice president.

Hupp Corp., Aviation Div.—John G. Morgan has been named manufacturing manager.

Engineering Castings, Inc.—David W. Boyd has been promoted to executive vice president and J. Raymond Mohlie has been named vice president and general manager.

Necrology

David M. Bell, 96, who did most of the metal working on Henry Ford's first "horseless carriage," died Jan. 12 in Detroit.

Ulysses L. Thomas, 69, former chief body engineer for the Chrysler Corp., died Jan. 12 in Detroit.

Stuart C. Rockafellow, 51, co-founder of the Robotron Corp., makers of industrial electronic controls for resistance welding, died Jan. 10 in Northville, Mich.

Tom Bradley, 66, president of the old Graham Paige Co. and the Hupp Motor Car Corp., died Jan. 3 in Glendora, Calif.

Raymond E. Moore, retired personnel director of Chrysler Corp.'s Plymouth Div., died Dec. 30 in Detroit.

Frank A. Shuler, 79, retired master mechanic at Chrysler Corp.'s Highland Park plant and past president of the American Society of Tool and Manufacturing Engineers, died Dec. 27 in Detroit.



OHIO WELDED TUBING

CORNERSTONE-LAYING WITH

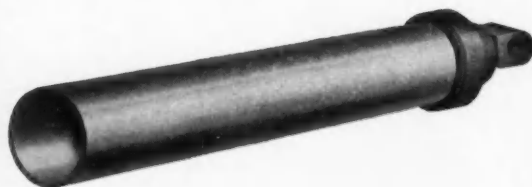
NO CEREMONY

In today's hustling, bustling construction business there's no time to stand on ceremony . . . no point in risking costly equipment failure.

To short-circuit mechanical downtime, leading construction equipment producers specify Ohio Tubing for power cylinders and fluid lines, mechanical and structural members. This gives equipment the heft and brawn to shrug off brutal, grinding punishment . . . gives equipment users a high degree of protection against disastrous delays.

You can strengthen your product — and its mechanical reputation — by specifying Ohio *Custom Made* Tubing. The name Ohio is the hallmark of the highest quality in tubing, both seamless and welded. And we're now able to deliver a broader range of welded tubing sizes, wall thicknesses and grades than ever before.

Let's not stand on ceremony. We want your tubing business — seamless to 7" OD, *welded up to 7½" OD*. For a fast start, contact your nearest Ohio representative, or send part drawings to the plant at *Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry In America.*



Ohio Seamless offers the broadest parallel range of both welded and seamless quality steel tubing in the industry.

OHIO OHIO SEAMLESS TUBE
Division of Copperweld Steel Company • **SHELBY, OHIO**
Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Representatives in principal cities. Check leading directories: THOMAS', MacRAE'S, CONOVER-MAST, SWEET'S, FRASER'S.

A-3305A

an Editorial

You Too Can Get \$8 for \$1



RECENTLY W. R. CAMPBELL, JR., test supervisor, Engineering Service Division, E. I. duPont de Nemours & Co., told the Winter Annual Meeting of The American Society of Mechanical Engineers that his company has saved more than one million dollars by using a new system of "value analysis." Although this project analyzed less than three per cent of the potential number of items which might have been studied, the company obtained a benefit of \$8 in savings for each \$1 expended. He recommended the use of such systems to engineering departments elsewhere in industry.

HE EMPHASIZED THAT "all of the results obtained are useless unless the information reaches the right point of application." He added, "such a method can be extremely important to the manufacturer who is squeezed by higher production costs while trying to hold the line on his own prices."

THROUGHOUT THE PLANTS manufacturing passenger cars, trucks, tractors, buses, engines, farm equipment, original automotive equipment components, aircraft engines and frames, engine powered construction equipment and national defense vehicular equipment, thousands of engineers are now working hard to complete comparable studies. It is therefore most timely for AUTOMOTIVE INDUSTRIES magazine to announce an important new and supplementary service which will help to speed the flow of technical and engineering information to the designers, research and development specialists and project engineers who need the latest technical information concerning materials, processes, components and contract manufacturing supplier facilities.

SUCH A SERVICE WILL BE PROVIDED to more than 6200 plants throughout these industries in the

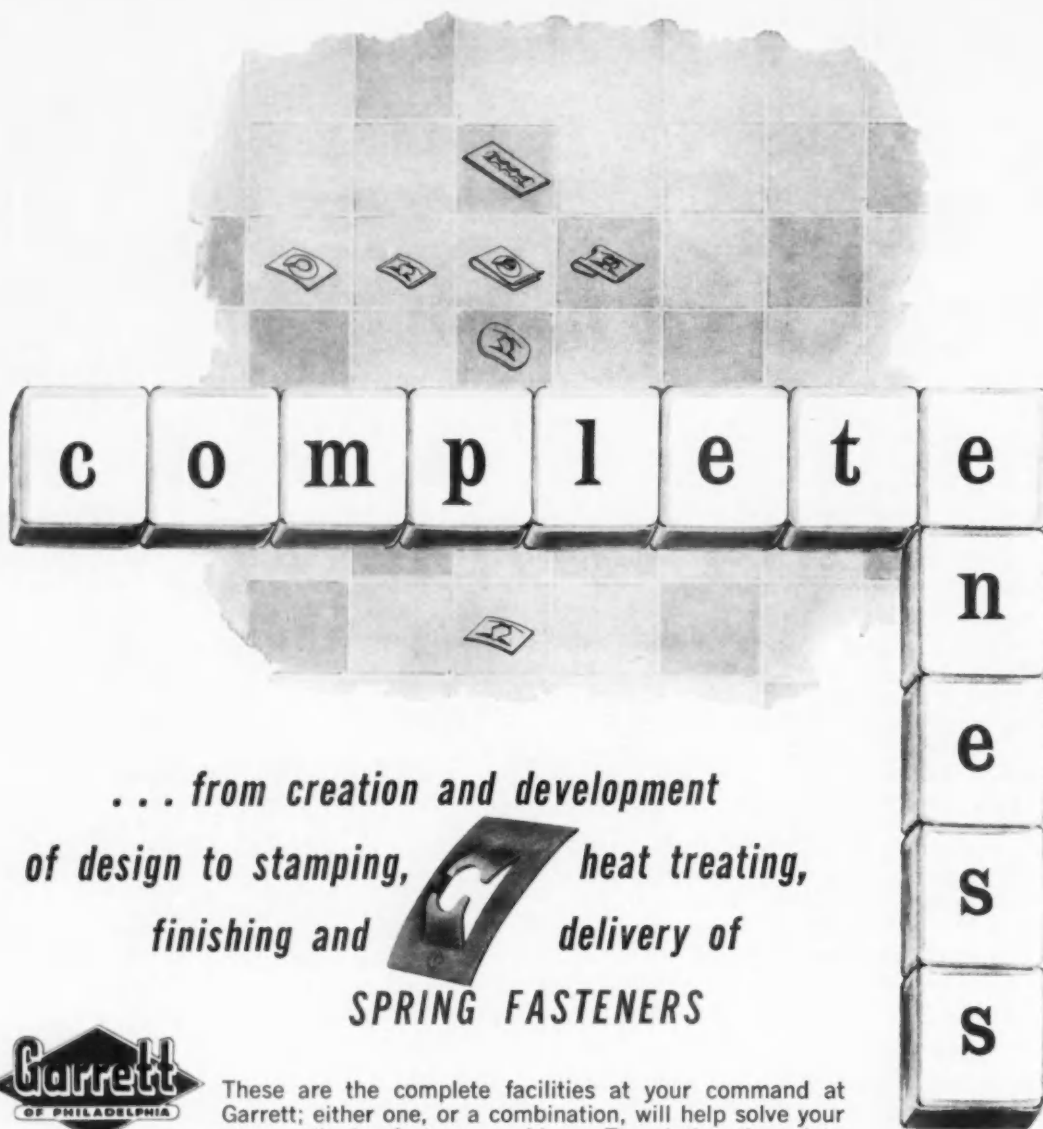
March 15 edition of AI. In the annual AI statistical and specifications issue, a large planning chart will be supplied. This can be used as a worksheet for setting up and completing a comprehensive analysis of potentially important design improvements. It contains keyed cross-reference spaces in which each important step of each project for design improvement can be entered.

THE LARGE 22 IN. BY 28 IN. WORKSHEET will be supplemented by a personally addressed mailing of a representative number of "Design Improvement Data Sheets." Each data sheet is limited to the presentation of the following items about a supplier: (1.) Product specifications and Improvement Factors, (2.) Technical Services Available from the supplier, (3.) Additional literature available about the supplier's product, and (4.) Distributors and Dealers selling the product. Each advertiser using one full page in the March 15 issue is entitled to include one technical data sheet printed on two sides in this mailing. There is no additional charge to reader or advertiser for this valuable new technical information service. It is estimated that the service will save each average reader about 30 days of time in obtaining complete information about the products contained in the mailing compared with past methods of communicating such data.

THIS PROGRAM PROVIDES another major advance in the services of AI to its readers and advertisers. The "Design Improvement Planning Service" directly and effectively reduces a substantial portion of the "Search and Technical Information Retrieval Time" required at this time of the year by every design and engineering department. Such data can go far to help any plant to obtain economies comparable to those described by Mr. Campbell; i. e., \$8 saved for every \$1 spent.

Harry W. Barclay

Editor and Publisher



... from creation and development
of design to stamping,  heat treating,
finishing and delivery of
SPRING FASTENERS



These are the complete facilities at your command at Garrett; either one, or a combination, will help solve your own particular fastener problem. Translating them into further meaning, they stand for: lower fastener cost . . . simplified fastener assembly . . . smoother and faster production line operation.

Garrett qualities are expertly built into every spring fastener, whether it's custom-designed by Garrett research-development . . . or a stock item in many varieties and sizes of flat nuts, "J" nuts, "U" nuts—in both cone and twin-prong impressions—as well as round and rectangular push-on nuts for immediate delivery.

For further information—particularly about Garrettizing—our new mechanical impact method of zinc plating **without** hydrogen embrittlement—write Garrett:


THE MOST COMPLETELY INTEGRATED PLANT IN THE INDUSTRY.




GEORGE K. GARRETT COMPANY, INC.

8881 TORRESDALE AVE., PHILADELPHIA 36, PA.

OTHER QUALITY PRODUCTS BY GARRETT

 helical spring lock washers

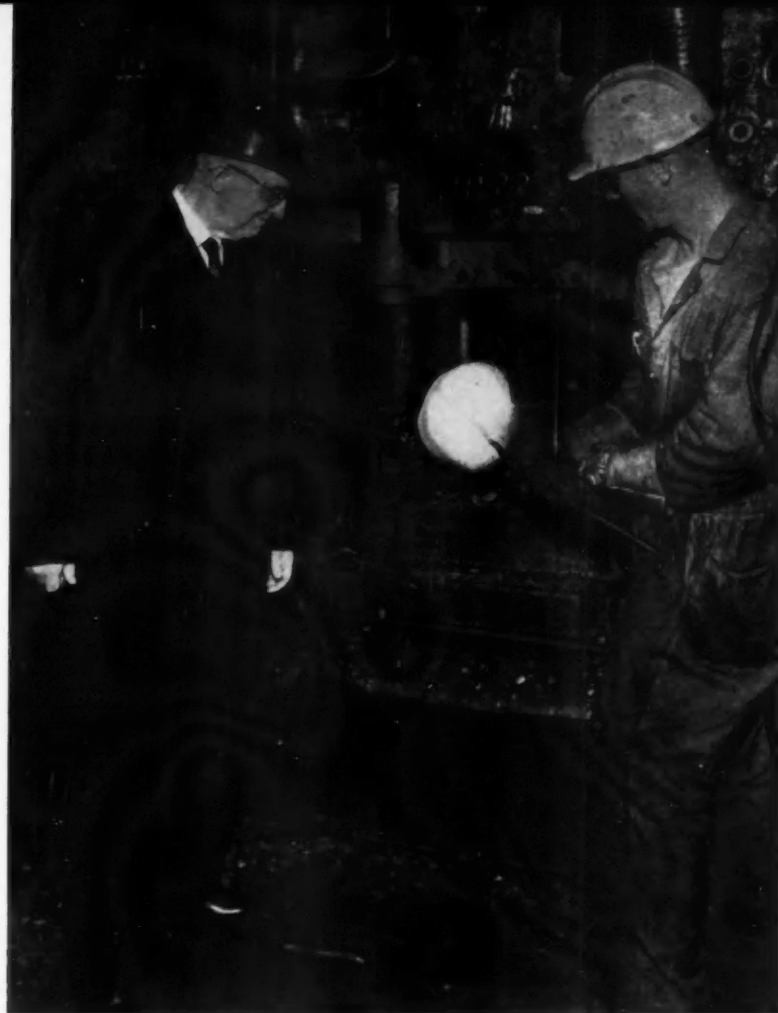
 flat washers

 stampings

 hose clamps

 spring washers

Plant visits are an important means of communication. Here, "visiting fireman" D. M. Allgood observes forging procedure in 2000 ton high-speed press at DFA member plant.



FORGING AHEAD

With Automotive Drop Forgings



By

DWIGHT M. ALLGOOD

Executive Vice President
DROP FORGING ASSOCIATION

THE commercial Drop Forging Industry is one of the most competitive in existence. This is a natural reflection of its major market, which consists of the industries served by AUTOMOTIVE INDUSTRIES. Competition among producers of end products such as passenger cars develops careful buying practices which keep suppliers in a perpetual competitive scramble. In selling the automotive market there is, let us say, "never a dull moment."

In addition to competition with each other, commercial makers of drop forgings face the competition of "captive" shops. Large companies in the automotive field—such as Ford, General Motors, and others—have their own forging plants.

On top of that there is the never-ending competition between forgings and castings. This is complicated, involving many factors, such as capacity to withstand strain and stress, machining costs, dies costs, per



Advertising plays a major role in Drop Forging Association. Discussing current DFA campaign are (left to right) Jon E. Jenson, DFA staff representative; Dwight M. Allgood, DFA executive vice president; and William F. Jordan, vice president and account supervisor of Meldrum and Fewsmith, Inc., DFA's advertising agency.



Forged steering spindle replaced a four-part assembly (wheel spindle, spindle support arm, king pin and spindle steering arm) and reduced weight by one-half.

Forged connecting rod and cap achieves excellent strength-to-weight ratio. Finished assembly weighs less than two pounds.



cent of scrap, and required tolerances. The drop forging producer is constantly called upon to prove that "you can do it better with a forging."

ADVANTAGES OF FORGINGS

I cite the above facts to make clear that the Drop Forging Industry is no bed of roses. It is true that because of their inherent qualities, with which everyone is familiar, forgings possess certain advantages that make them essential for countless purposes. Everything that moves on wheels or wings needs drop forgings. But in today's competitive picture a forging company that would sit back and rely upon sheer need for its particular output would be out of business.

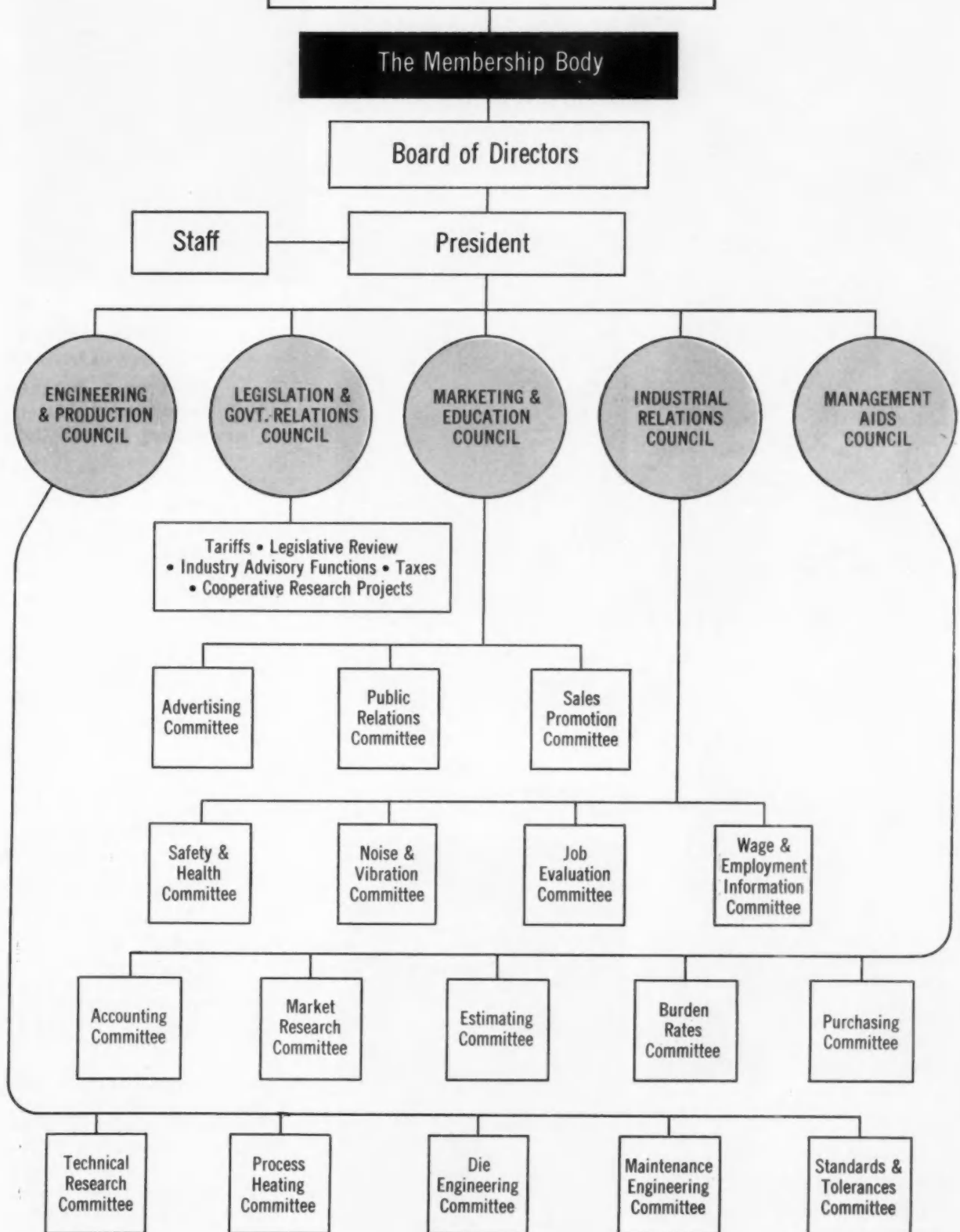
The commercial Drop Forging Industry has developed and held its automotive market by research, by product development, by anticipating individual customer requirements, and by paying particular attention to reducing customer production costs.

HELPING AUTOMOBILE PRODUCERS

In automobile manufacture, the savings of five minutes per part in machining time may be significant—in aircraft engines, a weight reduction of less than a pound. In the use of forgings, factors of cost and factors of toughness and resistance to breakage are intermingled. They present constant problems; and it is in helping to find solutions to such problems that the commercial Drop Forging Industry maintains and advances its position.

This has been done, in the main, through individual relationships between forging companies and customer companies, rather than through trade association activities. Many examples, however, are reported to the Drop Forging Association. The following case studies serve to illustrate the type of cooperation which exists between forging companies and customers in the automotive field:

DROP FORGING ASSOCIATION ORGANIZATIONAL DIAGRAM



COUNCIL CHAIRMEN



● **CHAIRMAN**, Council on Legislation and Government Regulations

GEORGE G. WILCOX
Chairman of the Board
Storms Drop Forging Co.



● **CHAIRMAN**, Council on Marketing and Education

DAVID G. BROWNE
Vice President
Broderick Div. of Harsco Corp.



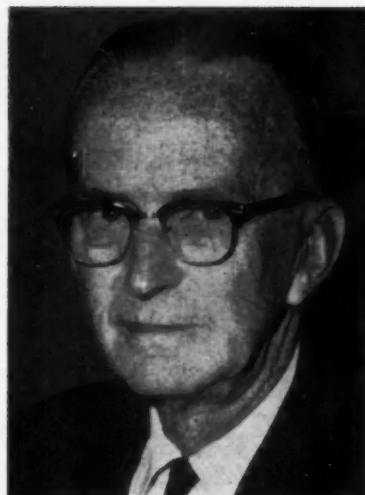
● **CHAIRMAN**, Council on Engineering and Production

ALEXANDER F. SHERYS
Vice President and Gen. Mgr.
Porter Forge & Furnace Co., Inc.



● **CHAIRMAN**, Council on Management Aids

ROBERT T. HERDEGEN, JR.
Director of Marketing
Dominion Forge, Ltd.



● **CHAIRMAN**, Council on Industrial Relations

WALTER A. FRAZEE
Senior Vice President
Steel Improvement & Forge Co.

CASE No. 1

Problem: To increase strength of steering knuckle sufficiently to permit raising axle load rating from 18,000 to 22,000 lbs. without increasing size, weight, or cost.

Solution: Forging engineers considered this a problem of choice of material, and on that basis the part was produced as a forging.

Results: The rating was raised as desired, and in addition, weight was reduced, cost per piece at point of assembly was reduced, inspection time was cut, a saving of 5 per cent in machining time and labor was realized, and rejections fell from 25 per cent to virtually nothing.

CASE No. 2

Problem: To make a stronger clutch yoke without increasing cost or adding undesirable weight.

Solution: Material — SAE 1045 Steel. Forging engineers found that forging so increased the strength and toughness of this material that forged yokes weighing 22 per cent less than former design were actually stronger.

Design features on a forged spring spacer receive special attention as Raymond W. Paskert, Mondie Forge Co., Inc., explains the details during a visit by D. M. Allgood.

Results: Savings included less metal used, less machining, fewer rejects, less inspection. Cost of conversion was more than covered by savings in first 1,400 pieces.

CASE No. 3

Problem: To cut costs by simplifying truck crankshaft design without sacrificing required features, and without risk to satisfactory part service.

Solution: Forging engineers avoided limitations posed by "difficult" or unusual shapes, angles, and dimensions by designing forged crankshaft counterweights to be joined by resistance welding to the forged crankshaft.

Result: Important economies were produced with no reduction in quality. Simplification of production resulted since much of the work required to complete various sections of the part could be accomplished before the part was assembled by welding.

CASE No. 4

Problem: Tractor manufacturer required a wheel knuckle capable of equalizing front wheel loading when used with power steering system.

Solution: Forging engineers designed a 15-inch forged wheel knuckle with gear segment machined at the upper end and lower end acting as wheel spindle.

Result: Less front end bounce, improved steering, reduced tire wear.

CASE No. 5

Problem: To increase dependability and provide greater factor of safety for hydraulic control cylinder piston rods on off-highway equipment.

Solution: After consultation with forging engineers, manufacturer converted part from weld-

ment to forging. Material used in initial tests was AISI 1141.

Result: Greater strength, reduced machining costs, greater resistance to bending tension, and compression.

The annual volume of commercial drop forging business is larger than many people realize. In 1959 we estimate that drop forging sales to the industries represented in AUTOMOTIVE INDUSTRIES totaled some \$420,000,000. This includes passenger cars, trucks and busses, off-highway equipment, tractor and farm equipment, engine-powered construction equipment, engine-powered industrial trucks, industrial and marine engines, and aircraft engines.

The above total is significant, in view of the operation of captive shops by the larger customer com-

panies. It would indicate recognition of the value of the independent commercial companies as experimenters, as developers, as pioneers in new and better ways of doing things. The independents *must* excel in this, in order to survive.

ASSOCIATION COOPERATION

This brings me to the subject of the Drop Forging Association, which has as its membership some eighty companies producing the bulk of the commercial drop forgings produced in the United States and Canada.

The Association was formed in 1913. For many years it concerned itself with internal industry problems, following the traditional trade association pattern. In 1958,



FORGINGS HAVE SERVED WELL

By E. S. Wellock

Manager, Manufacturing Plants

**Chevrolet Motor Division
GENERAL MOTORS CORP.**

"Forgings have served well, in the overwhelming majority of applications, to the extent that today the term 'Steel Forging' automatically means strength and quality."

—DROP FORGING ASSOCIATION
August Meeting, 1959

however, following the moving of the Association office from Lansing to Cleveland, the Association re-organized along lines that I believe are unique in trade association practice.

A trade association in a major industry is confronted by two main problems:

1. Sorting the multiplicity of subjects, of interest to the industry, into logical and related groupings, for discussion and action;

2. Securing maximum participation by member companies and affording full opportunity for the expression of individual viewpoints.

We approached the first of these problems by making a thorough analysis of all avenues of Association interest, and then assembling, in categories, those which were naturally related to each other. As a result, we came up with five major areas, or, you might say, five main divisions, of association activity. The natural outcome was to organize the Association on a divisional basis.

DIVISION FUNCTIONS

The Association has the usual officers and Board of Directors; but its operating structure consists of five Divisions, as listed below. Note the close relationship between

the subjects assigned, respectively, to each Division:

Division of Engineering and Production
Standards and Tolerances
Avenues of research
Die-sinking technology
Maintenance costs and problems
Cooperation with users of forgings on technical subjects

Division of Marketing and Education
Industry Advertising
The Association's external magazine
Industry publicity
Development of promotional material for member use
Educational programs

Division of Industrial Relations
Wage data
Safety and health
Noise and vibration
Job description and wage incentives
Recruiting

Division of Legislation and Government Relations
Study of proposed laws
Data on importations and tariff study
Taxes
Cooperation with Government on statistics, research, and national defense

Division of Management Aids
Accounting procedures
Analysis of markets
Burden costs
Estimating methods
Industry statistical reports

Note how logical is the segregation of these fields. Some are external; some are internal. Some are technical; some are not. All told, they cover the ground; but each Division is an example of specialization.

TYPICAL OPERATIONS

Now as to the format devised to function under this system:

Each Division is headed by a Council, which meets periodically.

Each Division sets up its own Committees, for the consideration of specific subjects.

Committee recommendations are submitted to the Board of Directors, along with the Council's comments thereon, pro or con.

Action may be taken only by the Board of Directors.

In addition, the President may at any time call a Conference of representative members, to discuss a question raised by a committee, or one which in his judgment calls for special consideration.

The breadth of participation which this system affords is self-evident. As I said before, we have some eighty member companies. During the last twelve months, 12 committees set up by our five Divisions have held 27 meetings, and there have been 4 Conferences—not to mention the regular Directors' meetings.

RESEARCH FOUNDATION

One of the Association's most significant accomplishments is its success, under the impetus of the Division of Marketing and Education, in spearheading a national Forging Industry Educational and Research Foundation, which is now in the process of formation.

We had long been aware that there were many engineering graduates who actually left school without having any clear-cut idea of the difference between a forging and a casting. The extent of public ignorance on this score was brought home to us when we asked a commercial artist, who was supposed to be reasonably familiar with basic industrial facts, to design a cover for our magazine. What he came up with was not

OFFICERS AND DIRECTORS



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Executive Vice President,
Pittsburgh Forgings Co.



PRESIDENT

ELMER W. CRESS

President of Buchanan
Steel Products Corp.



VICE PRESIDENT

WILLIAM A. CARLILE, JR.

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General Manager,
Kortick Mfg. Co.

Forgings and Miscellaneous Primary Metal Industries



Forging production is largely concentrated in the same states in which automotive vehicle, engine and parts manufacturing is located.

adequate for use.

We came to the conclusion that this was not all the fault of educators; part of it was our fault. So we decided to do something about it. But we feel that the interest in the matter was far broader than just our own. So we look to other organizations throughout the Metalworking industry to join; Trade Associations as sustaining members, and companies and individuals on a dues basis. We are hoping, too, for contributing and commemorating memberships, from those who may wish to endow the Foundation with capital gifts.

The purposes of the Foundation are stated as follows:

1. To promote formal education and scientific research, primarily in technologies of and related to the forging industry, by awards, grants or endowments to be applied toward scholarships, teaching fellowships, faculty seminars, textbooks, visual aids, and other teaching equipment and facilities for scientific research in schools, colleges, universities and other tax-exempt institutions within the United States of America.

2. To receive money and other property, real, personal or mixed, by gift, devise, bequest,

dues or otherwise, to apply the same both as to principal and income in furtherance of the foregoing and related educational, scientific and charitable purposes.

From a long-term point of view, the value of such a Foundation to the users of forgings should be even greater than to forging manufacturers.

CUTTING PRODUCTION COSTS

I would like to conclude with an incident illustrating how our member forge plants are continually striving to better serve the automotive market.

Several years ago a member plant developed a die design which allowed plugging and piercing of the bosses on forged automotive idler arms. With the bosses pierced, core drills could be employed for finish machining. Considerable metal was saved in the plugged portions of the bosses, tolerances were maintained, and, in addition, the chamfer on the large boss was coined during the piercing operation, eliminating a broaching operation.

The dies which produced this

idler arm featured a pair of standing plugs 1 inch high. On the basis of their own experience, automotive engineers rejected again and again the idea that these plugs could stand up on a production run.

Yet, one of the Big Three auto producers "took a flyer" and specified the pierced idler arm—exhibiting confidence in the inexhaustible resources of individual enterprise among members of Drop Forging Association. As a result he was able to cut machining costs 20 per cent!

And this is but one of many examples showing how cooperation between DFA members and the automotive industry has reduced production costs and fostered mechanical betterment in components for the machines and conveyances of our high speed world. ■

More Realistic Trials

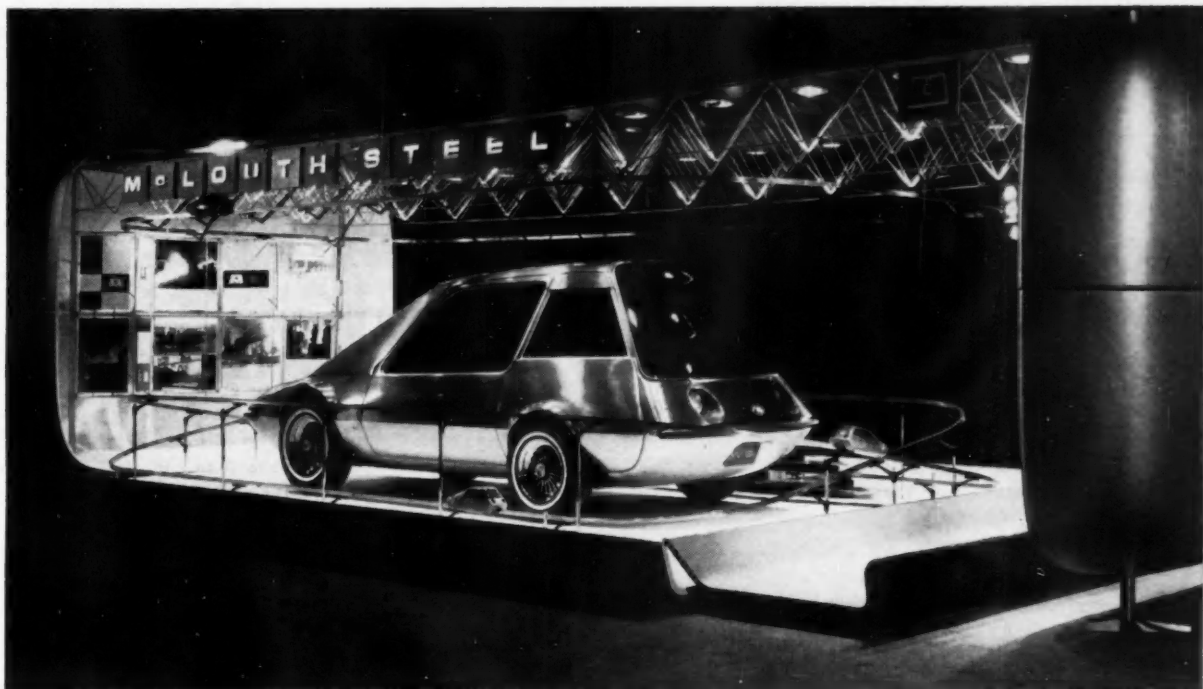
Pure Oil Co. plans to make its 1961 economy trials at Daytona International Speedway more realistic by raising the speed from 25 to 40 mph. Pure Oil officials said in Detroit that the higher speed should produce a more realistic mileage figure than the 51 mpg marked by the winning car at the 1960 trials.

The Pure Oil trials will be held Feb. 14-16 as part of the NASCAR 13th annual speed weeks, extended this year to a full month. The schedule winds up Feb. 26 with the NASCAR Grand National 500 race.

Eagle Missile Contract

The Navy has awarded a \$26-million follow-on contract to the Bendix Corp. for continued development and evaluation of the Eagle missile system. A \$21-million follow-on contract for Bendix was announced by the Navy last April.

The contract for the Eagle is under the management of the Bendix Systems Div., Ann Arbor, Mich., as prime contractor. The Eagle, a long-range air-to-air interceptor guided missile, will be used to destroy enemy aircraft or aerodynamic missiles, the Navy said.



A concept of the future in stainless steel. The city of tomorrow with a unique monorail system for high speed transportation of a personal vehicle that operates on and off the system. McLouth Steel Exhibit, S.A.E. Exposition, Detroit, Jan. 1961.

DESIGNING A DISPLAY OF TOMORROW'S TRANSPORTATION

By WILLIAM W. SCHMIDT, President
WILLIAM W. SCHMIDT ASSOCIATES



WILLIAM W. SCHMIDT

SELDOM does an industrial design firm have the opportunity of working on a project as exciting and thought provoking as the one we have just completed for the McLouth Steel Corporation. It began when we were contacted by this company and asked to create a display for the 1961 SAE Exposition to be held in Detroit's fabulous new Cobo Hall in January. This would have to be a display that would dramatically portray the part Stainless Steel would play in the future—and do it convincingly.

We were allowed free rein to develop a concept that would be suitable and practical for display purposes. It is not often that an industrial designer is permitted such latitude by a client.

We then had a series of "brain-storming sessions" in which all possible concepts were discussed.

MONORAIL VEHICLE COMBINED

MANY excellent themes were evolved but, as is usually the case, one was outstanding. We agreed upon a concept that would project personal transportation and living into the future. This was based on the belief that future travel may rely on monorail systems for the safe, convenient and rapid transportation of people and goods between distant points. To accomplish this, we developed the idea of a city of tomorrow with a unique monorail system for high speed transportation of a personal vehicle that could operate on and off the system. This entire concept would be constructed in a display 30 by 20 by 8 ft featuring the personal vehicle in full scale surrounded by a stainless steel city and a miniature monorail system in action.

We proceeded on a series of sketches and layouts to convey our idea to the McLouth management. This

was put together as a complete package with a finished scale model, timing charts, methods of manufacturing and complete budgets for the entire program.

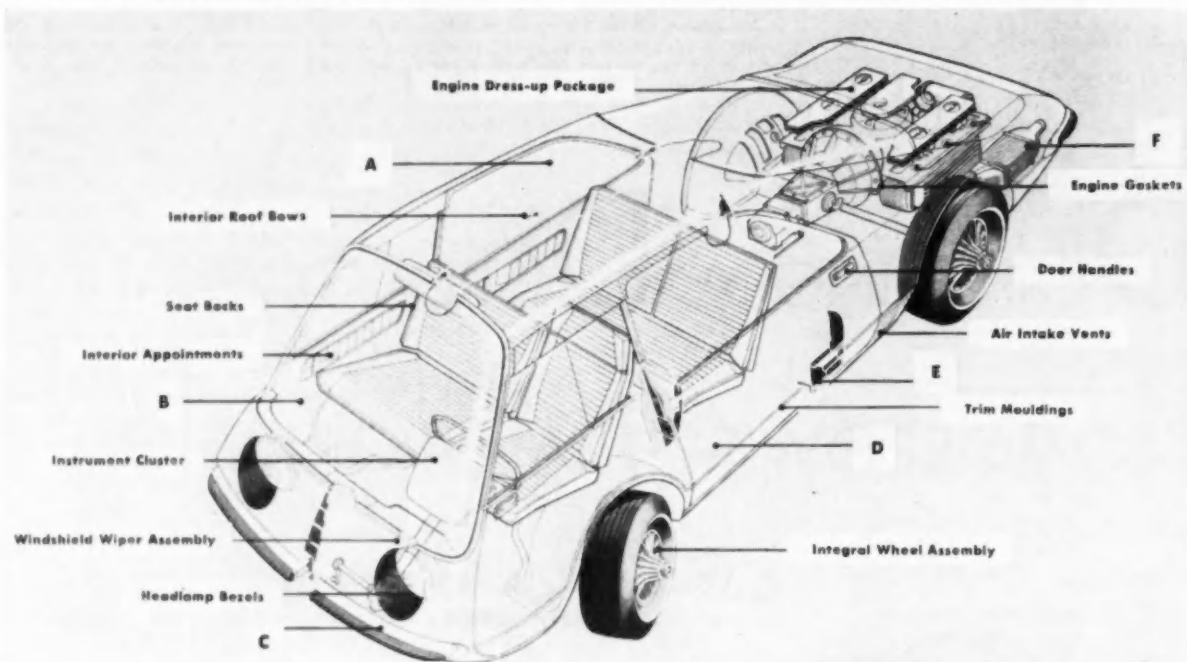
Then the proposal was made to the McLouth management. It was accepted with a great deal of enthusiasm and many additional good ideas came forth from this meeting. One, that was of particular noteworthy, was the idea of having a full color brochure, depicting the entire story, to go along with the display.

THE THEME APPROVED

As a result of this most important meeting, we now had our theme approved, the design roughly worked out, timing set, space acquired, budgets approved and a brochure approved.

Hundreds of sketches were made on every phase of the program. The vehicle was designed in great detail, paying particular attention to the uses of Stainless Steel and a 3/8 clay model was built of the vehicle.

WHERE STAINLESS STEEL MAY BE USED IN VEHICLE OF THE FUTURE, THE XV '61



The Identified Parts are in Stainless Steel

A

Upper structure including front and rear header bars, roof rails, and A, B and C pillar posts utilize the durability and beauty of stainless steel. The outstanding strength/weight ratio permits ultra-thin structural sections. Exposed surfaces are finished to obtain the inherent luster of stainless steel.

B

Interior panels of the unitized body are textured and embossed for additional rigidity. These exposed stainless steel structural panels, in brushed and polished finishes, are used in conjunction with fabric appliques to impart a rich interior decor.

C

Bumper assemblies, front and rear, of a unique impact channel-shock molding design have a gleaming stainless steel jacket to withstand abrasion and corrosion.

D

Exterior body panels of stainless steel assume maximum corrosion resistance and reduce body weight through high strength.

E

Rocker panel and door sill, of integral design, utilizes stainless steel to provide maximum strength and durability required for unit body construction.

F

Exhaust system, of unusual compact design, takes full advantage of the high corrosion and heat resistance properties of stainless steel.

From this complete full-size surface development drawings were made and shipped to Creative Industries where the full-size monorail vehicle was entirely fabricated in Stainless Steel.

Next, the roof of the display itself was constructed of tubular Stainless Steel in a geometric pattern and the end supports were made in the same manner, supporting two huge fiberglass end caps. Clay models were made for these caps, then plasters pulled and finally the end caps (in four sections) were bolted together.

The floors, walkways, lighting, track control system, graphics and literally thousands of details were designed, engineered and built over a period of six months.

Once the vehicle design was completed and the final design for the display was approved, it was possible to have the brochure work proceed concurrently. This, in itself, was quite a project and required complete color renderings as well as a technical production illustration, in great detail, of the vehicle and layouts for the brochure proper. This whole package was turned over to Mr. George Black, Account Executive from Denman & Baker, who had to write copy for the entire story, proof read it and set it in type, in addition to the production work. The liaison time required on this type of program is amazing but quite necessary. Finally, it went to press.

SMALL SCALE MODELS

SIMILARLY, the same kind of attention had to be paid to the details of the small scale models which would run on tracks during the show.

We first built a one-tenth size clay model from the three-eighths clay we had previously designed. This was cast into fiberglass and fitted with a carrier, also in fiberglass. (This carrier was designed to carry the vehicle on the track as shown in the photos.) Then the chassis was made of wood and a mock-up motor with its own drive wheels was installed for test purposes. After building a small inclined test track and running the test model for ten days and nights, we knew it would work. We then cast the chassis making it into one piece metal unit that was very strong, yet light and durable. Placing our fiberglass bodies on these chassis complete with their carriers (we made six although we anticipated only using three) finished this phase of the program.

The next major portion of our overall program was to design the rather complicated monorail track system on which the vehicles would ride.

For this purpose, we designed a double Stainless Steel track mounted back to back, with an insulating material in between. This gave us the strength we required to span the rather long distances between pylons, the bright appearance we desired and excellent conductivity.

We made many scale drawings, finally choosing one track system that provided for three different vehicles to be running on separate systems all at one time.

After checking the angles of incline and decline to make sure our vehicles would maintain a certain speed,

THE XV'61 FACT SHEET

Featured at McLouth Steel's Exhibit at the SAE Convention in Detroit was the XV'61, a concept of the car of the future that persons may either drive on the highways or attach to a unique monorail system and flash to destinations with no driver attention.

This unusual car is designed to suit the particular requirements of a projected and unique monorail system, not to foretell automotive designing and engineering of the future. If a monorail system were in existence today, this car could be built.

DIMENSIONS

Car overall height...59 in.	Front tread54 in.
Car overall width...64 in.	Rear tread50 in.
Car overall length...170 in.	Front tire 23 in. (5:20x13)
Wheelbase90 in.	Rear tire 27½ in. (7:50x14)

UNUSUAL FEATURES

The car on display is full size and its unit body construction employs stainless steel in body panels, pillars and rocker panels to assure high strength-weight ratio and high corrosion resistance.

The XV'61 will accommodate four passengers with luggage.

Interior panels of the unitized body are textured and embossed for additional rigidity, these exposed stainless steel structural panels, in brushed and polished finishes, are used in conjunction with fabric appliques to impart a rich interior decor.

Exterior body panels of stainless steel assure maximum corrosion resistance and reduce body weight through high strength.

Rocker panel and door sill, of integral design, utilizes stainless steel to provide maximum strength and durability required for unit body construction.

The XV'61 employs new type bumpers. Much bigger than the car bumpers of today, this car's bumpers are made of a stainless steel blade with a heavy vinyl rubber center to make parking easier and to soak up shock of light impacts.

The unusual exhaust system of compact design takes full advantage of the high corrosion and heat-resistant properties of stainless steel.

we approved this basic track system and then proceeded to find the answer to the problem of how we would hold the tracks in the air, at varying angles, simply.

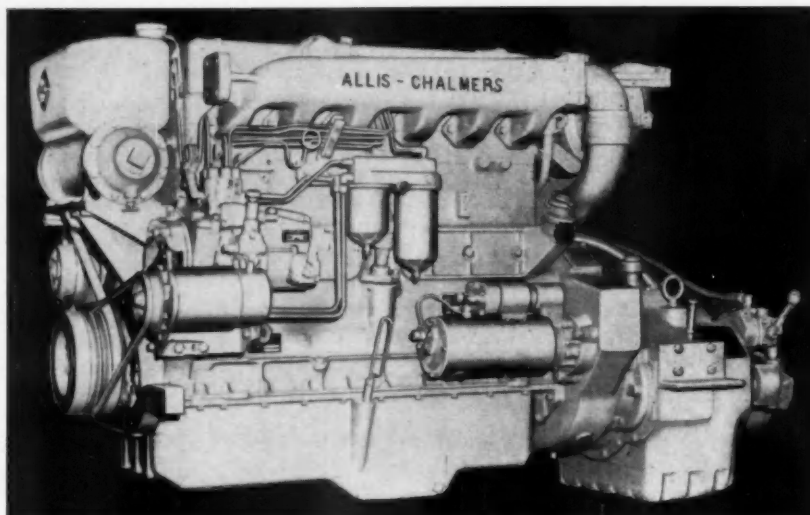
MODULAR ASSEMBLY DESIGNED

WE designed a very versatile modular Stainless Steel rod and bracket assembly that, because it was adjustable to any height and angle, answered our problem very nicely. Since it was very strong, yet light and airy, it did the job without obstructing the view of any part of the display. (Continued on page 65)

Allis-Chalmers has just introduced this heavy-duty marine Diesel, a 516-cu-in. six-cylinder ohv engine with a max rating of 200 shp at 2200 rpm. It is available in turbocharged, as well as naturally-aspirated configurations, designated Models 11000 and 10000.

PART II

By Charles A. Weinert
EASTERN EDITOR



1961 MARINE ENGINES

Display Marked Advances in Design

PERHAPS the biggest 1961 innovation of at least four inboard engine builders is the offering of inboard-outboard combinations—packages with outboard-type drives.

In addition, quite a number of

the makers have introduced brand-new inboard engines, including Diesel as well as gasoline types. Some are in-line and others are V-types.

Generally speaking, most of the inboard builders are continuing to

emphasize compactness and low silhouettes, also weight-saving through extended usage of aluminum.

Brief descriptions of the various makes of new inboard marine engines including their major characteristics, are contained in the following:

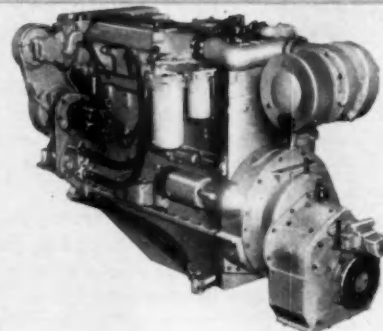
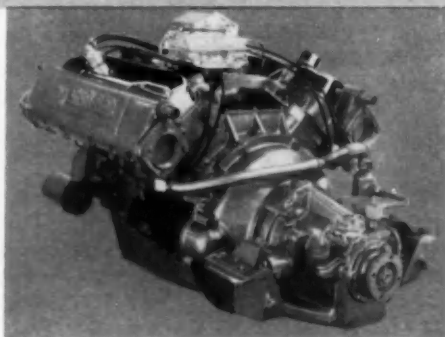
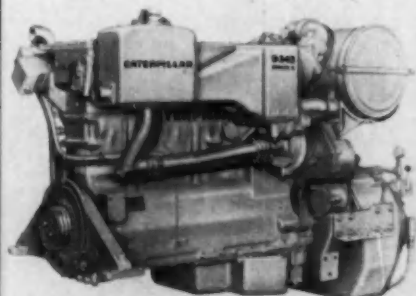
Allis-Chalmers Mfg. Co.

This maker of heavy-duty engines has added a brand-new Diesel to its line. The new engine, available both in naturally-aspirated and turbocharged versions, is a six-cylinder ohv with a bore of

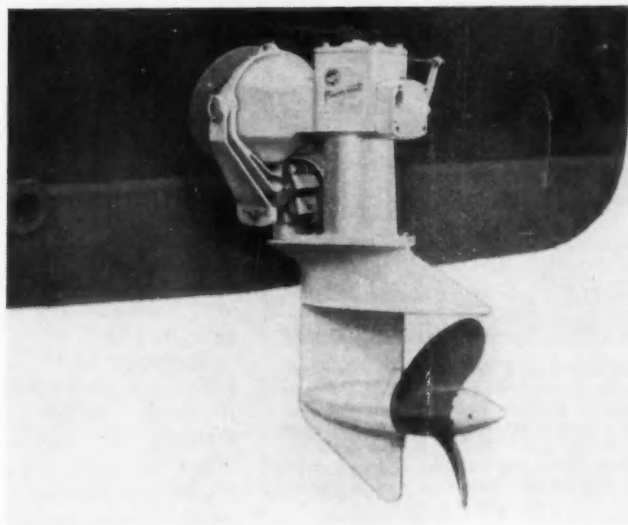
Caterpillar's Model D343 marine Diesel is an 893-cu-in. engine which when turbocharged and after-cooled has a max rating of 460 hp at 2000 rpm. Design features include seven-bearing crankshaft, wet cylinder liners, and four valves per cylinder.

Chrysler's M-413 marine engine is the largest and one of seven gasoline models introduced in the new "M" series. This engine has a displacement of 413 cu in., and is rated 280 hp at 4000 rpm. Chrysler, in addition, has unveiled four marine Diesels.

Cummins has modified 10 of its marine Diesels to provide lower profile. Illustrative of the redesign is the Model NRTO-6-M pictured. It is a six-cylinder turbocharged Diesel rated 335 hp at 2100 rpm for pleasure-craft and 220 hp at 1800 rpm for workboats.



Eaton's PowerNaut is a new outboard drive for inboard-mounted engines. Dearborn is offering it in combination with the 85 hp 144-cu in. *Interceptor*. The drive kicks up if an underwater obstacle is struck, and can be tilted, swung laterally, and swiveled 180 deg.



Part I of this article, which appeared in the January 15 issue of **AUTOMOTIVE INDUSTRIES**, described the new Outboard Motors. Part II supplements the prior installment by describing and illustrating the new Inboard Marine Engines

4 7/16 in. and a stroke of 5 9/16 in. Total piston displacement is 516 cu in.

The turbocharged Model 11000 is rated 200 shp at 2200 rpm for light-duty applications, and 150 shp at 1800 rpm for heavy-duty applications.

The naturally-aspirated Model 10000 is rated 140 shp at 2200 rpm for light-duty, and 100 shp at 1800 for heavy-duty uses.

Weight of the turbocharged 11000 Diesel is 2350 lb with 2:1 gear, starter and generator.

Design features include seven-bearing crankshaft, wet cylinder

liners, aluminum steel-backed main and connecting rod bearings, and alloy-steel valve-seat inserts on both intake and exhaust valves.

Ballantine Industries

Two small gasoline engines, primarily used as auxiliary power in sailboats of 20- to 35-ft length, are offered as heretofore by this builder.

The Kermath Sea Pup is a single-cylinder L-head engine with a bore and stroke of 2 3/4 by 2 3/4 in. Piston displacement is 18 cu in. It is rated 5 hp at 3200 rpm, and with direct drive weighs 75 lb.

The Kermath Sea Twin is a two-cylinder unit having a bore of 2 3/4 in. and a stroke of 2 1/2 in., for a total piston displacement of 30 cu in. This engine is rated 10 hp at 3000 rpm, and has a weight of 109 lb.

Both models are obtainable as basic engines, engines with reverse gear, or engines with reverse gear and 2.5 to 1 reduction gear. Also with electric starter, generator, and fuel pump kits.

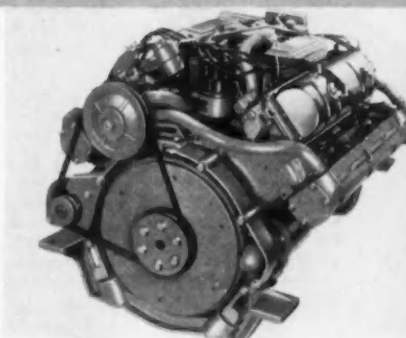
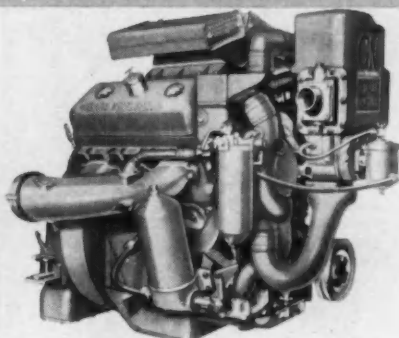
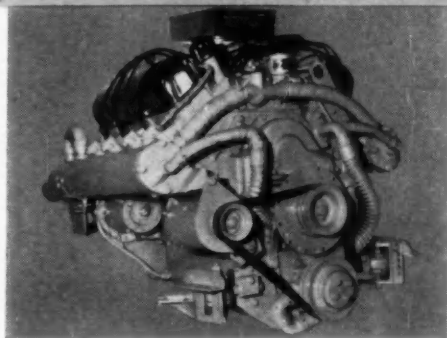
Brennan Motor Mfg. Co.

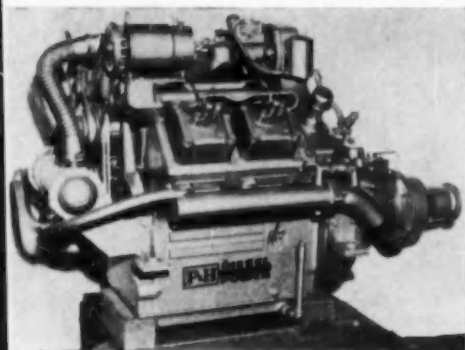
The Brennan "Imp," an inboard-mounted engine with an outboard-

Dearborn's new 260-hp *Interceptor* V-8 has a piston displacement of 390 cu in. and weighs 860 lb. This engine, as well as the 240-hp *Interceptor*, is available with an optional 60-amp alternator. Aluminum saves weight in many of the marine components.

GM Diesel's Series 71 six-cylinder V-type marine engine is rated 252 hp at 2300 rpm. Its bore is 4 1/4 in., stroke 5 in., and displacement 425.6 cu in. This series comes in three, four and six-cylinder vertical models, and in six, eight, 12 and 16-cylinder V models.

Gray Marine's new "compact" V8-178 is a 250-cu-in. engine, rated 178 hp at 4400 rpm. Flywheel is at forward end; aluminum has been employed extensively to cut weight. Engine is suspended on cradle mountings of ductile iron with rubber in compression.





The new P&H V-463, built by Harnischfeger Corporation's Diesel Engine Div., is a two-stroke, 90-deg V-4 Diesel. Aluminum is used in major components; porting for intake and exhaust. This engine has a max rating of 135 hp at 2800 rpm and a 252-cu in. displacement.

type drive, is being featured by this builder of four-stroke marine engines.

The "Imp" (pictured in AI for August 15, 1960, page 70) weighs 200 lb, and includes a four-cylinder gasoline engine with a bore of 2.26 in. and stroke of 3.125 in., for a total displacement of 50 cu in. The engine is rated 35 hp at 5000 rpm and has a compression ratio of 8 to 1.

Mounting of the outboard-type drive is through the transom of the boat. The drive tilts up when striking an underwater object, when beaching, or while being transported. It has a built-in reversing gear including a multiple-disk clutch.

Caterpillar Tractor Co.

Latest model in the Caterpillar line of 11 heavy-duty marine Diesels is the D343 which has a maximum pleasure-boat rating of 460 hp at 2000 rpm and a continuous rating of 310 hp at 1800 rpm.

The D343 is a six-cylinder four-stroke Diesel with a bore of 5.4 in. and a stroke of 6.5 in., displacing 893 cu in. It is available turbocharged, and also turbocharged with after-cooling. Weight of the latter version is 5065 lb. Construction features include seven-bearing crankshaft, wet cylinder lin-

ers, and four valves per cylinder, each of which is Stellite-faced and seats on a replaceable insert. Dual overhead camshafts actuate the valves, which are fitted with valve rotators.

The Caterpillar marine power range (continuous ratings) runs from 50 hp at 2000 rpm, to 600 hp at 1225 rpm. Dry engine weights vary from 1628 to 16,830 lb. With two exceptions, all of the models are available turbocharged and most of these are obtainable with after-cooling combined with turbocharging.

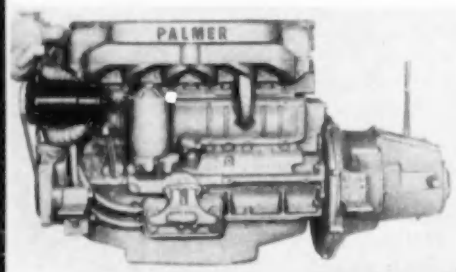
Chris-Craft Corp.

The 1961 line of Chris-Craft in-board marine engines remains basically the same as last year, with four gasoline models having power ratings from 60 to 275 hp.

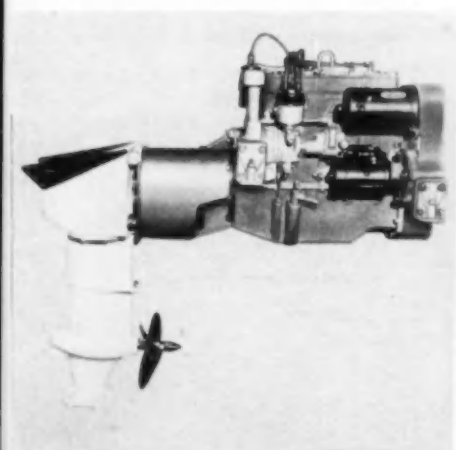
Two of the engines are ohv V-8's. The larger of the two is the Model 430, which has a bore of 4.3 in. and stroke of 3.7 in., giving a total piston displacement of 430 cu in. It is rated 275 hp at 4000 rpm. Compression ratio is 8 to 1. Engine weight, dry, is 994 lb.

The second V-8 is the Model 283, rated 185 shp at 4000 rpm. It has a bore of 3⁷/₈ in. and stroke of 3 in., for a total piston displacement of 283 cu in. It likewise has a four-

(Turn to page 60, please)

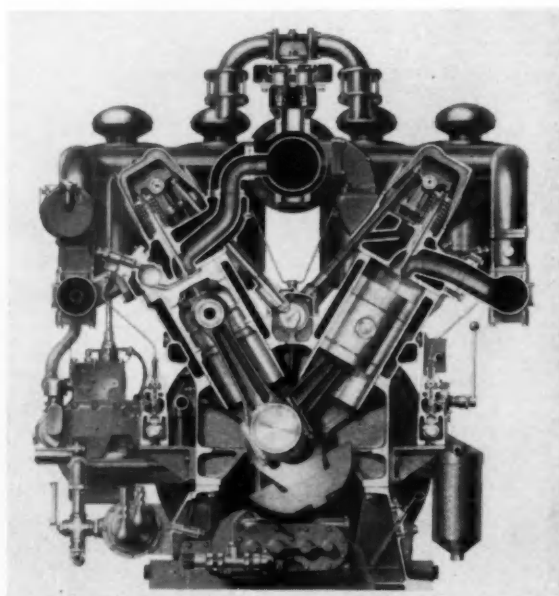


Palmer has introduced this 301-cu-in. marine Diesel, designed around a six-cylinder International Harvester cylinder block. Designated the IH-D301, it has a pleasure boat rating of 110 hp at 3000 rpm. Weight is 1150 lb, overall length 51¹/₂ in., and width 24¹/₂ in.



Universal for 1961 is offering two in-board-outboard packages. One is designed around the 70-hp Unimite Four engine (pictured); the other around the 113-hp Bluefin, a six-cylinder engine. Two new V-8's of 188 and 277 hp also are in this year's line.

Cross-sectional view of Waukesha's largest marine Diesel, the VLRD Series "Reliance," a V-12 with a bore and stroke of 8¹/₂ x 8¹/₂ in. and a total piston displacement of 5788 cu in. This engine, with turbocharger and intercooler, has a continuous-duty rating of 1100 hp at 1215 rpm.



Passenger Car Makers Using More Zinc Die Castings

Average for the New Models is About 86.5 Lb per Car,
Up 14.5 Lb Above the Amount Used in 1960

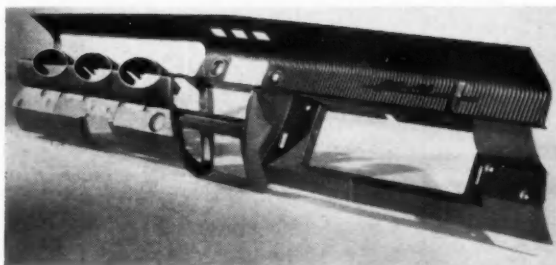
ACCORDING to John L. Kimberley, American Zinc Institute's Executive Vice President, "Zinc's position in the automotive industry is stronger than it has ever been. Problems in corrosion performance of plated zinc die casting have been resolved; use of zinc is up significantly in standard-size cars, and the demand for galvanized sheet steel for the compacts, as well as a number of full-size models, is creating an entirely new market.

There is no question that some other materials are vigorously com-

peting in the automotive market, but this has had no appreciable effect on the acceptance of zinc in the industry."

To document the zinc industry's confidence, Kimberley reports that car makers are using about 15 per cent more zinc for die castings in the 1961 standard size cars. The average for the new models is approximately 86.5 lb per car, a 14.5 lb increase over the 1960 figure.

The appearance of brightwork and the durability of that appearance directly influence the acceptance of the total product. Con-



The 1961 Oldsmobile dash console is said to represent the largest interior zinc die casting ever used in the automobile industry. Nearly five feet long, over a foot high, and five inches deep, it is used "across the board" on all standard models.

New Chevrolet dash console is single-piece casting weighing only 13 lb. It is 34 3/4 in. long, 15 in. wide and 4 in. deep.

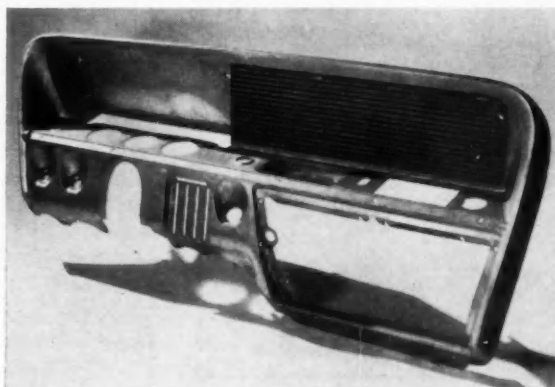


TABLE I

ZINC DIE CASTING IN 1961 COMPOSITE CAR

FRONT END

Head Lamp Housings
Head Lamp Doors
Head Lamp Bezels
Radiator Grille and Moldings
Grille Frame Sections
Fender Wrap-Around Elements
Fender and Hood Ornaments
Escutcheons; Car Name Letters
Parking Light Frames
Windshield Pillar Moldings; Air Scoops
License Plate Frame

UNDER THE HOOD

Carburetor
Fuel Pump Bodies
Vacuum Pump
Ventilator and Defroster Diffusers
Automatic Transmission Parts
Horn Motor Casing and Vibrator
Distributor Parts
Blower Assembly Parts
Windshield Wiper Motor Body and Parts

SIDE HANG-ON MOLDINGS

Window Frames and Separators
Door Handles and Lock Parts
Radio Antenna Housings and Mechanisms
Side View Mirror Frame and Brackets
Scuff Plates; Decorative Trim
Emblem for Wheel Hub Caps
Car Name Letters
Quarter Window Trim

REAR

Tail Light Frames and Assemblies
Back-Up Light Frames and Bodies
Trunk Ornaments, Handles and Letters for Car Name
Window Trim; Upper Bumper Trim
Quarter Panel Molding
Fender Ornaments
License Plate Frame
Bumperettes
Rear Grille Trim

INTERIOR

Horn Ring
Instrument Panels
Instrument Panel Parts
Door Handles; Ventilator Locks
Window Handles; Cranks
Dome Light Bezels
Seat Adjusting Mechanisms, Knobs
Defroster Parts
Rear View Mirror Assemblies
Ash Tray Covers and Parts
Instrument Panel Radio Parts
Rear Radio Speaker Grille
Ornaments and Trim
Parking Brake Handle
Ignition Switch; Heater Parts
Rear, Upper Quarter Panel
Coat Hooks; Robe Rail Brackets
Heater Parts
Outlet Grille; Glove Box Door
Window and Reveal Moldings
Turn Signal Mechanisms
Assist Handles

TABLE II

ZINC DIE CASTINGS IN THE 1961 CHRYSLER IMPERIAL 4-DOOR HARDTOP

OUTSIDE DECORATIVE PARTS	No./Car	Wt./Each (lb)	Total Wts. (lb)
Grille.....	2	5.14	10.28
Grille Upper Bar.....	1	3.82	3.82
Headlights.....	2	9.85	19.70
Headlight Upper Eyebrow.....	2	1.26	2.52
Grille Medallion.....	1	.42	.42
Headlight Support.....	2	.76	1.52
Grille Bar Lower.....	2	.98	1.96
Headlight Doors.....	4	1.28	5.12
Hood Trim.....	2	.62	1.24
Hub Shell Trim.....	4	.33	1.32
Roof Bars.....	2	1.95	3.90
Rear Post Trim.....	2	.38	.76
Rear Fender Medallion.....	2	.21	.42
Imperial Name Plates.....	2	.15	.30
Deck Lid Trim.....	1	1.21	1.21
False Wheel Trim, Deck Assembly.....	1	2.52	2.52
Deck Extension Trim.....	3	—	1.31
Deck Lid Handle.....	1	1.97	1.97
Side Moldings.....	8	—	12.50
Sub Total.....	—	—	71.89
OUTSIDE DECORATIVE-FUNCTIONAL PARTS			
Parking Light Housing.....	2	2.48	4.96
Wiper Escutcheon Adapter and Transmission.....	2	.32	.64
Air Intake Cowl.....	1	8.60	8.60
Aerial Support.....	1	.38	.38
Side View Mirror.....	1	1.68	1.68
C. V. Frames.....	2	4.50	9.00
Rear Window Frames.....	2	6.30	12.60
Door Handles.....	4	2.35	9.40
Tail Light Assembly.....	2	—	4.70
Back Up Light Housing.....	2	.54	1.08
Sub Total.....	—	—	53.08
INSIDE DECORATIVE PARTS			
Door Medallions.....	4	.06	.24
Center Post Trim.....	2	.35	.70
Front Seat Trim.....	2	.95	1.90
Sub Total.....	—	—	2.84
INSIDE DECORATIVE-FUNCTIONAL PARTS			
Remote Control Power Escutcheon Plates.....	4	.25	1.00
Door Release and Trim.....	4	1.72	6.88
C. V. Locks.....	2	.13	.26
Reveal Moldings Front Post Lower.....	2	.30	.76
Visor Supports.....	2	.45	.90
Instrument Cluster and Trim and Speedometer.....	—	—	10.50
Dome Light.....	1	.62	.62
Radio Defroster and Grille.....	1	2.06	2.06
Radio Trim.....	1	.45	.45
Knobs.....	5	.13	.65
Brake Release Knob.....	1	.20	.20
Horn Ring and Trim.....	—	1.72	1.72
Rear Reveal Molding.....	6	.41	2.46
Locks.....	5	.09	.45
Coat Hooks.....	2	.07	.14
Dome Light Switch Cover.....	1	.10	.10
Turn Signal Housing.....	1	1.32	1.32
Shift Housing Assembly.....	1	.85	.85
Heater Housing Assembly.....	1	.85	.85
Seat Adjustment.....	1	6.37	6.37
Seat Adjust Knob.....	1	.15	.15
Window Adjustment.....	1	1.97	1.97
Sub Total.....	—	—	40.88
FUNCTIONAL PARTS			
Shock Valves.....	8	.05	.40
Horn Bodies.....	2	1.32	2.64
Carburetor Parts.....	—	.69	.69
Sub Total.....	—	—	3.73
GRAND TOTAL.....	—	—	172.22

sciousness of this fact by plating suppliers, platers, die casters and the automotive industry resulted in a crash program in 1957 to combat premature pitting and blistering of plated zinc cast hardware.

Intensive efforts to develop improved plating techniques paid off with the adoption of three basic methods, which are now in use throughout the automotive industry in either standard or modified form.

- Duplex Nickel—0.0003 copper, 0.0009 semibright nickel, 0.0003 bright nickel and 0.00001 minimum chromium.

- Bright Crack-Free Chromium—0.0003 copper, Duplex Nickel (0.0006 semi-bright nickel and 0.0002 bright nickel), 0.00003 minimum of bright, crack-free chromium.

- Dual Chromium—0.0007 copper, 0.0008 nickel, plus two relatively thin layers of chromium, totalling a minimum of 0.00003.

The effectiveness of the new electroplates was described in a Battelle report as:

"The degree of improved durability in terms of prolonged life can be estimated conservatively as about three to one in the case of a composite of duplex nickel and 0.05 mil of crack-free chromium. Judging from accelerated corrosion tests, a composite of bright nickel and 0.15 mil of micro-cracked (or dual) chromium should have about the same life as the duplex nickel and 0.05 mil crack-free chromium."

Leading zinc "heavyweight" is the Chrysler Imperial 4-door hardtop which carries a total of 172 lb of die castings. A variety of applications include grille components totaling over 16 lb, headlight housings weighing 9.85 lb each, rear window frames weighing 6.3 lb each, an instrument cluster assembly of 10.5 lb, and 8 side moldings totalling 12.5 lb (Table II.).

"Runner-up" is the Lincoln Continental 4-door hardtop with a total of 153.47 lb. Largest single use of zinc die castings on this model (Turn to page 51, please)

Machine Tool Builders Report Moderate Improvement in Business

By
**Charles A.
Weinert**

EASTERN EDITOR

MACHINE tool builders as of January 1—surprising as it may appear—reported moderate gains in order backlogs and inquiry activity compared to mid-year 1960. They also predicted a small increase in new business for the 1st Half '61 over 2nd Half '60.

Nevertheless, these favorable conditions do not apply throughout the entire industry. There is a difference between individual companies. Some are doing very well, others are not. As an *overall industry group*, however, the business conditions—based on current data—are as stated above.

These impressions are obtained from consolidations of 37 special reports to AUTOMOTIVE INDUSTRIES. The reports were cooperatively supplied by leading machine tool builders in response to AI's latest periodic survey questionnaire. Results of similar surveys of the machine tool industry were presented last year—in AI issues of January 1, April 1, July 1, and November 1, 1960.

Details of the present survey follow:

ORDER BACKLOGS

With respect to unfilled orders on hand as of January 1, 1961, versus those on hand July 1, 1960: Backlogs of "about the same" volume were reported by 15 companies.

Increased backlogs, ranging from 5 to as much as 250 per cent, applied to 14 companies. The *average* of this group is +57 per cent—or +43 per cent with the top performer (250 per cent increase) not included.

Decreased backlogs, ranging from 7½ to 50 per cent, were listed by 7 companies—with a group

AI SURVEY Indicates—

- Gains in Order Backlogs
- Gains in Inquiry Activity
- Gains in Prospective Business

average of —27 per cent.

For the 36 companies giving numerical percentages on the ups and downs, the group *average* is +17 per cent—or +10 per cent when weighted to exclude the effect of the unusual performer.

Builders' comments on this phase of the survey are:

A. V. Bodine, president, Bodine Corp.—"Mostly defense orders" (in an up of 64 per cent).

Ralph Lagerfeldt, executive vice-president, Colonial Broach & Machine Co.—"Increase seems to be mainly in cutting tools" (up 25 per cent).

George K. Cassady, general sales manager, Giddings & Lewis Machine Tool Co.—(indicated an up of 14 per cent versus July 1, and then stated) "Up 60 per cent from January 1, 1960, reflecting increased shipments in 2nd Half '60."

J. A. Oeming, sales manager, Wickes Machine Tool Div.—"Still heavy activity from foreign business, but increase in U. S. activities has helped" (up 38 per cent).

Charles W. Doepke, vice-president sales, The G. A. Gray Co.—"There was a surge of activity beginning August 1960 through November" (up 75 per cent).

AUTOMOTIVE ORDERS

In the questionnaire, each of the builders was asked, "How much of your total orders on hand

as of January 1 is represented by orders from automotive companies."

The vast majority (30 companies) reported automotive orders on hand. Automotive portions ranged from as little as 3 per cent, to as much as 93 per cent of total orders on hand. Eight companies were in the 60 to 85 per cent bracket.

Seven companies, among the 37, listed no automotive orders on hand as of January 1.

Builders' comments:

J. A. Oeming, sales manager, Wickes Machine Tool Div.—"Above percentage (36) does not include foreign auto companies."

Charles W. Doepke, vice-president sales, The G. A. Gray Co.—"Automotive inquiries are and have been at an all-time low."

Company Spokesman — "About 80 per cent—mostly foreign."

INQUIRY ACTIVITY

As in the case of order backlogs, the relationship of inquiry activity at January 1, 1961 with that at July 1, 1960 was requested.

Inquiry activity at the "same" level was reported by 6 companies.

Increased activity, ranging from 1 to 438 per cent was given by 21 companies. The *average* for this group is +43 per cent—or +24 per cent not including the top (438 per cent) runner.

Decreased activity, of from 10

to 50 per cent, was listed by 6 companies averaging -22 per cent.

For the total of 33 companies reporting numerically, the group average is +24 per cent. Weighted (without the 438 per cent included) it is +11 per cent.

Builders' comments:

A. V. Bodine, president, Bodine Corp.—“Very spotty” (up 15 per cent).

Ralph Lagerfeldt, executive vice-president, Colonial Broach & Machine Co.—“A great number of inquiries are now being received from foreign countries” (up 50 per cent).

Company Spokesman — “Up because of annual budget preparations.”

J. A. Oeming, sales manager, Wickes Machine Tool Div.—“Inquiries are down (20 per cent), but quality is up.”

Howard A. Finch, manager of marketing, Jones & Lamson Machine Co.—“We are flooded with inquiries (up 30 per cent), but percentage of orders to inquiries is most disappointing.”

Charles W. Doepke, vice-president sales, The G. A. Gray Co.—“Activity has dropped off (50 per cent) from December 1st, 1960.”

BUSINESS OUTLOOK

Questioning as to the outlook for order receipts in the 1st Half '61 compared to the situation which applied during the 2nd Half '60 gave the following results:

The “same” volume was predicted by officials of 14 companies.

An upward trend, ranging from 5 to as much as 50 per cent, was forecasted by 14 executives—averaging out at +17 per cent. Four in this group (including the 50 per cent forecast) showed reduced order backlogs. The remaining 10, however, showed order backlogs either the “same” or higher than those at July 1, 1960. If the 50 per cent prediction is excluded, the weighted average for 13 companies then becomes +14 per cent.

A downward trend, of from 10 to 30 per cent, was predicted by 5 officials—giving a group average of -21 per cent. However,

one (of the two) -30 per cent forecasts was made by the builder who indicated a rise in order backlog of 250 per cent. Nevertheless, with this builder not included, the average “down” is only slightly reduced—to -19 per cent.

Overall, among the total of 33 officials giving definite indications, the average prediction is for an increase in business receipts of 4 per cent. If it is weighted to exclude the 50 per cent “up” and the 30 per cent “down” forecasts referred to above, the average is then +3.6 per cent.

Builders' comments:

T. Lawrence Strimple, president, The National Acme Co.—“Business outlook the same, but has been about one-third better all through 1960.”

Ralph Lagerfeldt, executive vice-president, Colonial Broach & Machine Co.—“Up 25 per cent. Here we refer to certain stray orders received during the early part of 1961 which would not be normal for the industry.”

Howard A. Finch, manager of marketing, Jones & Lamson Machine Co.—“The same, unless forecasts on capital expenditures are wrong.”

Charles W. Doepke, vice-president sales, The G. A. Gray Co.—“Up 20 per cent. Outlook for 1st Quarter is not promising; may improve slightly in 2nd Quarter.”

AUTOMOTIVE PROSPECTS

Query as to whether any sizable automotive business was in sight brought the following response:

The replies were almost evenly split—19 saying “yes” and 18 saying “no.”

Builders' comments:

Company Spokesman—“Possible overseas capital equipment purchases.”

Company Spokesman — “Yes, U. S. A. automotive after March '61.”

Ralph Lagerfeldt, executive vice-president, Colonial Broach & Machine Co.—“No sizeable programs as such, but forecast seems to indicate a steady automotive machine tool business, and an equally good cutting tool business.”

George K. Cassady, general sales manager, Giddings & Lewis Machine Tool Co.—“Yes, particular interest in machines related to die manufacture—new techniques now available through the application of tape control.”

J. A. Oeming, sales manager, Wickes Machine Tool Div.—“Yes, expect some large programs to break in first half of 1961.”

Howard A. Finch, manager of marketing, Jones & Lamson Machine Co.—“No, but we anticipate a number of single machine orders for spot replacement or change of method.”

Company Spokesman—“Yes, retooling 75 per cent, new 25 per cent.”

Company Spokesman — “Yes, one very sizable machine tool contract in prospect (automotive).”

EQUIPMENT DELIVERIES

Those addressed were asked whether the delivery time on orders placed during the 2nd Quarter '61 was likely to run longer than that being quoted during early January.

The same delivery rate is foreseen by the big majority—28 companies.

Longer deliveries, ranging from 2 to 8 weeks, are expected to apply in 6 instances.

One said his deliveries would be shorter.

Builders' comments:

Company Spokesman — “Nine months instead of 10 months.”

A. V. Bodine, president, Bodine Corp.—“No change, now quoting 18 to 24 weeks. Depends on complexity of jobs.”

George K. Cassady, general sales manager, Giddings & Lewis Machine Tool Co.—“Answer depends completely on machine type—longer on some, same on others.”

Howard A. Finch, manager of marketing, Jones & Lamson Machine Co.—“Longer 4 to 6 weeks. Present volume does not permit desired flexibility in production.”

PRICES OF MACHINES

In response to an inquiry about price changes, 12 of the builders indicated that price increases had

recently been placed into effect, or were in prospect.

One showed an increase of 7 per cent effective in September, and another an increase of 8 to 10 per cent effective in October, 1960.

One indicated that a price increase had been placed into effect during the 4th Quarter, but gave no percentage.

Four reported increases of 3, 3, 5, and 25 per cent, effective January 1, 1961.

One listed a 10 per cent increase effective January 23 on one line of machines only—on which there had been no increase in three years.

Four others reported prospective increases. One of these did not mention the percentage, and stated it would be effective "as soon as possible." The other three reported prospective increases of 6, 10, and 10 per cent, effective February 15, "shortly," and in August '61, respectively.

Among the total of 35 responses to this phase of the questionnaire, 22 indicated "no change," and one reported lower prices.

RECOMMENDATIONS

The builders were finally asked, "Do you have any personal recommendations to make at this time to automotive industry officials which should be taken into account by them when planning for near-future machine tool acquisitions?"

Builders' comments:

T. Laurence Strimple, president, The National Acme Co.—"Modern high-productive and automatic machine tools are answers to the cost-price squeeze. We find this true in our own factories."

Company Spokesman — "Give the builders more lead time."

Company Spokesman — "Don't wait too long in your future machine tool acquisition planning and at purchasing. So-called crash programs are expensive and time-consuming not only to the consumer but also to the builders."

Joseph P. Crosby, vice-president sales, The Lapointe Machine Tool Co.—"Deliveries are getting tighter and automotive demands

appear to be becoming more urgent. I feel that it is most imperative for the automotive industry to realize these demands and place their orders accordingly."

Ralph Lagerfeldt, executive vice-president, Colonial Broach & Machine Co.—"We feel continual repair or reconditioning of old equipment should no longer have a place in industry. Many machines are beyond repair, and service rendered therefore is high."

George K. Cassady, general sales manager, Giddings & Lewis Machine Tool Co. — "Lead times will be extended as order board reflects an increased percentage of 'sophisticated' machine tools and controls."

J. A. Oeming, sales manager, Wickes Machine Tool Div.—"Plan on a longer lead time than they have been used to during the last three years."

Company Spokesman — "The whole tooling-up procedure could be speeded up if the industry could solidify their designs prior to placing orders for equipment."

Sim Budlong, vice-president sales, F. J. Littell Machine Co.—"We suggest that after jobs are quoted and before the customers place their orders that they check with the manufacturers concerning deliveries. We believe this is very important as the plant loadings change rapidly at times."

Howard A. Finch, manager of marketing, Jones & Lamson Machine Co.—"We know of many areas where the industry could install new cost-saving equipment and dispose of completely obsolete equipment. The cost of the new compact cars could be materially reduced if new machines that were right for the job were used, rather than the compromise of old retooled machines which are being used extensively. Another comment: We can do a better job of engineering and building machines when we are not pressed for quick deliveries."

Company Spokesman — "More planning—More lead time."

George Gorton III, president, George Gorton Machine Co.—"Now is an ideal time for working with a builder in selecting

proper equipment for programs. In the rush of high activity small details or features may be overlooked. Well-planned-for equipment is usually more productive and easily justified." ■

More Zinc Die Castings

(Continued from page 48)

is for grille parts, which total over 28 lb. Other applications include 10.5 lb for a rear deck lid extension trim, 16.24 lb for rear door frames, 16.54 lb for rear window assemblies, 10.82 lb for instrument housing and cluster, 11.62 lb for CV frames.

Other makes and models that have sharply boosted their requirements for zinc die castings include Buick, Cadillac, Chevrolet, and Oldsmobile (Table IV).

Because zinc die castings can be cast in large thin-wall sections, they are particularly suitable for one-piece instrument clusters. Notable examples include the Oldsmobile panel weighing 21.4 lb, Chevrolet 13.6 lb, Lincoln 10.8 lb, Chrysler Imperial 10.5 lb, Pontiac at 9.6 lb. Cadillac uses a massive 26.6 lb of zinc die castings for its instrument board grouping.

Zinc die castings are also holding on in the grille market. This year Buick, Oldsmobile, Pontiac and Lincoln have die cast zinc with grilles. Mercury, Chrysler, Imperial, American Motors, and Studebaker are also using substantial quantities of zinc for grille components.

Other parts that continue to rely heavily on zinc die castings include vent window frames, carburetors, heat and taillight housings, bezels and doors, outside and inside door handles, window crank handles and hardware, rear view mirrors, ornaments, and many others.

Big swing to unitized construction is another bright spot for zinc in the form of coated steel. Box structures have turned such areas as sills, rocker panels and side-rail supports into rust traps. The

(Turn to page 67, please)

AIR BRIEFS

By R. RAYMOND KAY

PACIFIC COAST EDITOR

WHAT'S ahead for the aerospace industry during 1961? Sales will hit \$11 billion. That's about the same as last year. Although the industry is pushing diversification, some 80 per cent of the sales will be for military products.

Missile spending will rise. And less money will go into aircraft.

Last year only 1200 military planes were turned out.

Sales in the commercial transport market will remain high. That goes for both business aircraft and helicopters.

Employment in the aerospace industry will continue to drop. Right now, it's the lowest since 1955. Just a few months ago, there were 252,000 fewer workers than in April 1957—the peak month since World War II.

Why the big employment drop? Missile making needs fewer production workers than planemaking. Even so, the industry still has 640,000 persons on its payroll.

During 1961 and for a couple of years after, missiles will still be custom-made. That's unless there's a National emergency.

Manned aircraft will remain the backbone of U. S. forces. Right now, 63 per cent of aerospace weapons spending goes into aircraft.

To sum it up, it will be a good year for the industry. But competition will be much stiffer. That goes especially for research and development contracts.

Changes in the Aerospace Industry

"We are living in a world of fantastic technological changes." So says Lockheed Aircraft's president, Courtland S. Gross.

"And for the aerospace industry,

the changes that are shaping its future fall into three broad groups," Mr. Gross points out. Here's how he sees it: (1) Changes in technology; (2) Changes in government defense policy; and (3) Changes in climate, both governmental and economic, in which the industry works.

Mr. Gross says the industry faces a lot of problems in the transition to the space age. There is more emphasis on research, less spending on hardware, lower production runs, far greater reliability, more money for technical studies, and a greater need for engineers and scientists.

The trend is toward more research, more testing, more development work on more exotic systems.

"Five years ago, Lockheed had one employee in engineering for every five employees in its manufacturing and related branches. Today, there are three engineering and technical employees for every five in manufacturing," Mr. Gross reports.

The first B-70 strategic bomber is on schedule for construction. North American Aviation released to its factory 11,000 basic engineering drawings needed to build the prototype of the 2000-mph. bomber.

The 11,000 drawings represent over 6 million engineering man-hours needed for the design and development of this bomber. The B-70 will be made almost entirely of stainless steel honeycomb to withstand 500 F. temperatures.

Expansion in Los Angeles Area

Memo to marketers: Be sure to keep your planning charts and your salesmen up-to-date on the Los Angeles Metropolitan Area. That hotbed of aerospace activity will get even hotter.

What's more, many firms are eyeing other industries—automotive, marine—as customers for

their products, materials, services.

Here's a rundown of companies in the Los Angeles area that will increase or improve their facilities. All these expansions are in the works right now:

Space Technology Laboratories, Inc., will put up a \$25 million space research and engineering center. This subsidiary of Thompson-Ramo-Wooldridge, Inc., bought a 110-acre site in Redondo Beach. When finished, there may be jobs for some 5000 persons—about 2000 of them engineers and scientists.

Filtra Corp., Burbank—filters for fuel gas, chemical and cryogenic fields. Reeves Brothers, Curon Div., Los Angeles—foam materials for automotive and aircraft use.

Shafford Electronics & Development Corp., Santa Monica—temperature and flight controls, ground support equipment. Dear-Bank Corp., Baldwin Park—hydraulic parts for aircraft and missiles.

Amphenol - Western Connector Div., Chatsworth—aircraft and missile connector and cable components. Regent Jack Mfg. Co., Inc., Downey—ground support equipment. Giannini Controls Corp., Systems Div., Duarte—data processing equipment, systems, controls.

Stromberg-Carlson Div., of General Dynamics Corp., El Segundo—missile communication systems. Fibre Glass-Evercoat Co., Inc., Gardena—polyester and epoxy auto body fillers and resins for marine use.

Shore-Calvenar Co., Paramount—replacement wheel covers for automobiles, Lear, Inc., Santa Monica—communication and navigation equipment, guidance systems. Hallamore Electronics Co. Div., Seigler Corp., Anaheim—missile launching equipment.

Walmore Equipment Corp., El Segundo—aircraft parts. Steel Building Div. of Calcor Corp., Huntington Park—bought by Rheem Manufacturing Co.'s automotive division in Fullerton. ■



***Roebling
Tire Bead Wire:
Packaged for
Maximum Benefit***

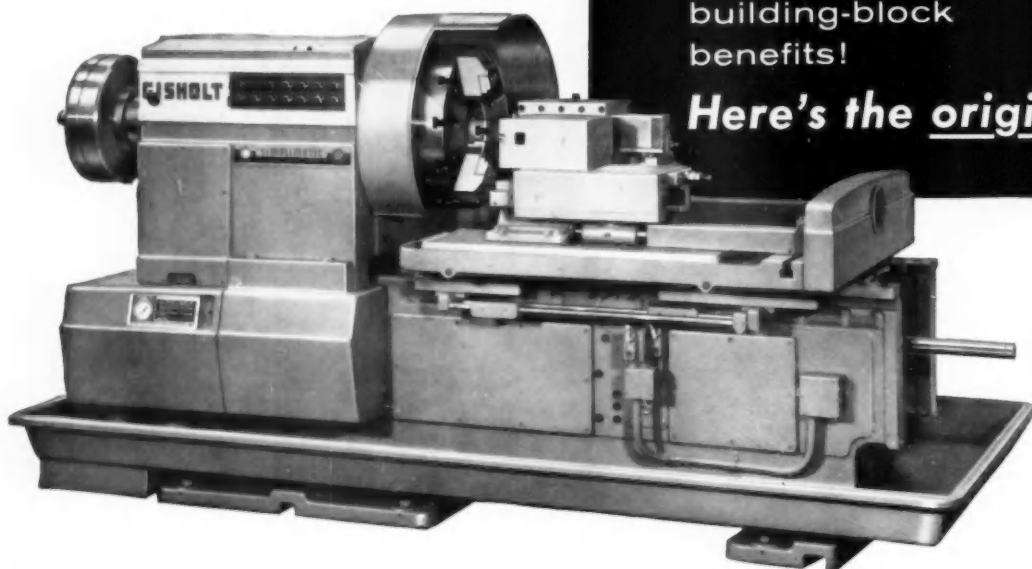
The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that

you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so

much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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Talk about
building-block
benefits!

Here's the original

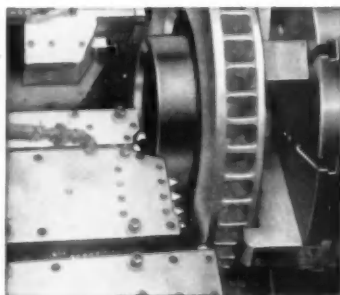
It does the work of special machines at standard machine cost

Here in the Gisholt MASTERLINE Simplimatic Automatic Chucking Lathe is the essence of the building-block principle: a standard headstock and bed casting with a wide, flat platen table. To this you add the building blocks for most efficient tooling on each specific job. Standard front, center, rear or auxiliary slides with tool blocks may be positioned wherever they are needed to handle a maximum number of surfaces per chucking.

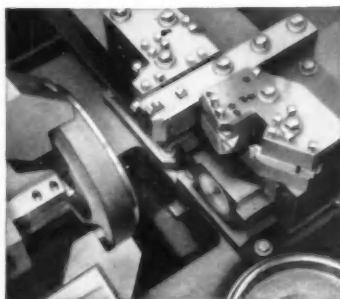
Between cycles, the platen table is well away from the spindle, providing easy access for loading and unloading. The table is screw-fed. This permits rapid advance to posi-

tion the tools right up to the work, or table-feed to bore, turn an O.D., or plunge facing tools to depth before slide movements begin. Each slide may feed at different rates, permitting an unlimited variety of cuts and tool approaches. Back boring and facing attachments permit machining front and back surfaces simultaneously, eliminating extra handling and equipment cost.

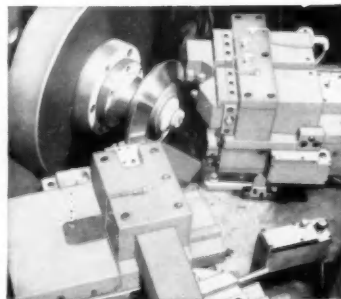
Three of the 39 jobs described in the Simplimatic Catalog are shown here. Write for Bulletin 1159-C or contact your Gisholt Representative to find out what the Simplimatic can do for you.



13.8 minutes! Cast iron rotor, 28" O.D., 6 1/2" wide. Table feed turns O.D., plunges facing tools to depth. Slides face flange, complete hub. Two-speed motor gives high speed for finish facing flange and chamfering.



2.4 minutes! Front and rear brake drums. Back facing attachment machines mounting face. Front slide turns and bores. Rear slide faces web and rim.



2.3 minutes! Steel bevel gear blank. Rear swivel-base slide tools straddle machine back angle, front co-bore and face as cam-controlled front slide tools face front angle.

• Turret Lathes • Automatic Lathes • Balancers
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GISHOLT

MACHINE COMPANY

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AUTOMATION NEWS REPORT

AUTOMATIC CONTROLS
PRODUCTION—VEHICLES—AIRCRAFT

By C. J. Kelly

ASSISTANT EDITOR

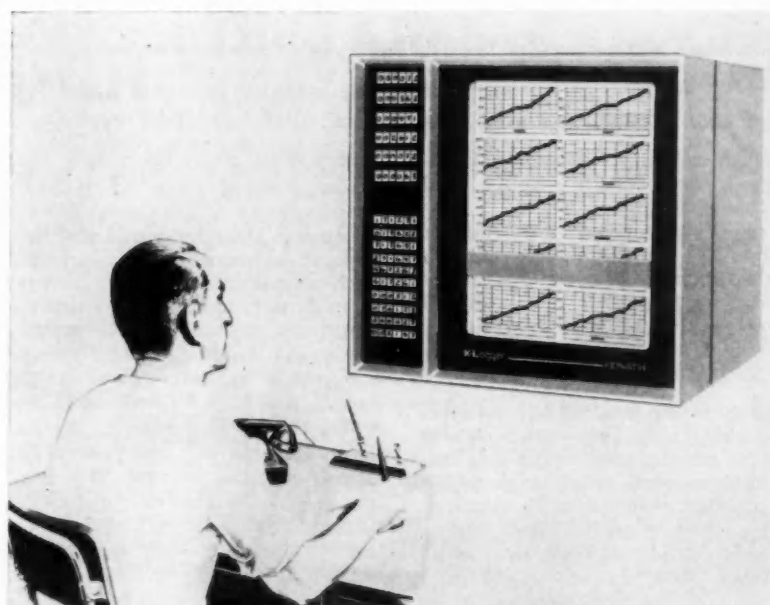
PRODUCTION RECORDER SHOWS MACHINE EFFICIENCY

A NEWLY developed system for recording production totals and production rates, computing machine efficiencies, and analyzing down time has been introduced by the Keinath Instrument Company. This unit, known as the K-Logger, records and displays graphically the production status of any number of machines on a minute-to-minute basis throughout the working day.

The K-Logger contains a master chart on which 4 by 6 in. graphs are printed, one for each machine. These graphs show clearly the following information: 1. Total number of pieces (or feet, pounds, gallons, etc.) produced since the beginning of the shift or day. 2. The rate at which they were produced, minute-by-minute, in relation to

what is normal for that machine. 3. When downtime occurred on any machine. 4. How long the downtime lasted. 5. The reason for the downtime. In addition to the detailed graph for each machine, the K-Logger provides a summary of the total downtime in machine-minutes caused by each of a number of common causes such as "Set-Up," "No Material" or "Breakdown."

The key to the easy readability of the production graphs, and the factor that makes them understandable from a distance, is the use of the "Ramp Chart" method of presentation. With this system, the production is plotted against time and the climb of the total throughout the day forms the "Ramp," the steepness of which shows the rate.



Production rates and totals being recorded on a minute-to-minute basis

Downtime which appears as a flat portion on the "Ramp Chart," is repeated in greater detail on a separate "Downtime Graph" immediately under each "Ramp Chart." The "Downtime Graph" shows not only the time and duration of the downtime but also the cause as diagnosed either automatically or by the operator.

Alongside the graph-sheet in the K-Logger are a number of digital counters. Six of these accumulate the number of machine-minutes of downtime from all machines for each of six causes. The other counters repeat in digital form the production count, starting either from the beginning of the day, or from the start of each job-order.

K-Logger systems are offered on rental, cancellable at any time. Cost of a typical installation for 16 machines, including maintenance, is less than \$300 per month. ■

DATA PROCESSING ADVANCES

REMINGTON RAND Univac Div. of the Sperry Rand Corp. claimed a major scientific breakthrough in the development of a new thin-film computer memory. With this data processing advance a whole new generation of computers will be able to operate in nanoseconds—billionths of a second.

Thin film computer memory consists of a series of metal dots, a few millionths of an inch thick, made by depositing vapors of iron, nickel, cobalt, or other ferromagnetic metals or their alloys, on a suitable sub-strate, such as a thin glass plate. Univac 1107 was the first computer to employ thin-film memory.

The Remington Rand Univac 1107 Thin-Film Memory Computer, the first of the third generation of commercially available electronic computers and the first computer to employ thin magnetic film memory, is an advanced solid-state data processing system. It was designed and developed to solve both complex problems off-line and real-time problems on-line.

The Univac 1107 system employs
(Turn to page 67, please)

SUNDSTRAND "Engineered Production" METHODS...

practical ideas for men who are responsible for manufacturing quality, quantity, and profit

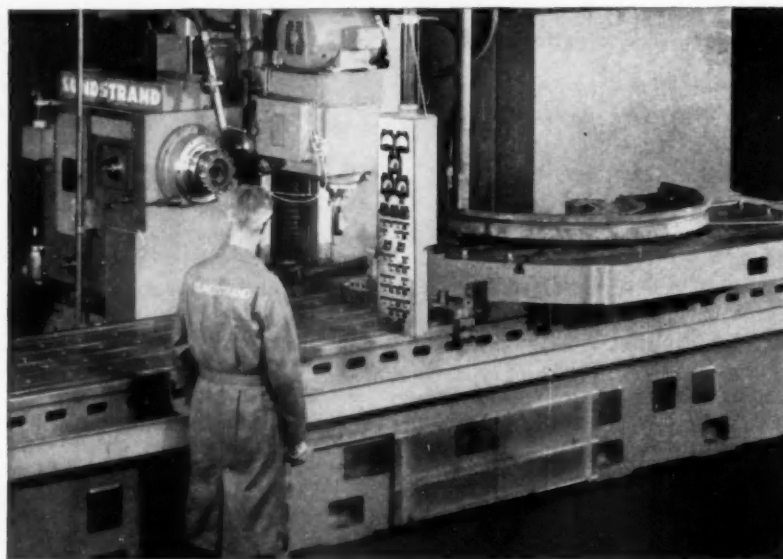
MILLING

— Sundstrand Rigidmil combines two operations, returns 25% of its cost annually

Turbine diaphragms formerly produced by a method requiring three machines now are turned out faster and better on a single Sundstrand Rigidmil with a vertical and a horizontal spindle. Two operations are required — machining of flat surfaces where the diaphragm halves are joined, and milling of special keyways, the latter performed by the vertical spindle of the Rigidmil.

The Sundstrand machine will return more than one-fourth of its cost annually by savings in direct labor, setup time, reworking, and hand finishing. Additionally, it releases floor space, will meet new demands for larger workpieces, and will permit better tool control. On some diaphragms, the new equipment will save four setups and 26 crane lifts.

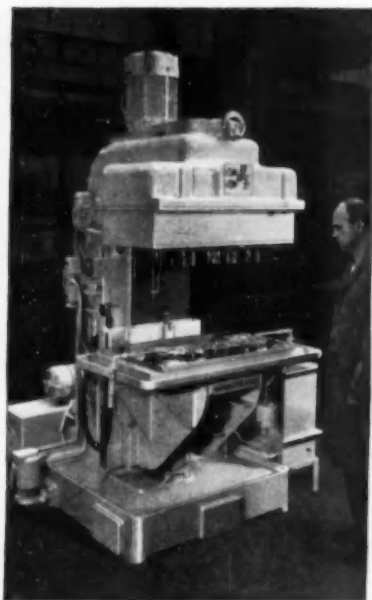
Selection of the machine was based on the proved performance of similar Sundstrand machines in the field,



and on the fact that it could be built specifically for the job almost entirely from basic standard elements.

Wherever you have operations that might be performed or combined on

a milling machine, a Sundstrand "Engineered Production" Analysis will help you establish the economic feasibility of a new machine. For more details on Sundstrand Rigidmils, ask for Bulletin M-224.



MULTIPLE-SPINDLE DRILLING

— new Sundstrand machine features low-cost precision heads which can be changed over in 15 to 20 minutes

Sundstrand multiple-spindle precision drilling, boring, reaming, and tapping machines embody a new concept which provides exceptional versatility and economy, particularly on nonferrous parts. The unique design of the heads eliminates all gearing and permits a complete change-over from one head to another in 15 to 20 minutes.

The moderate cost of the heads and the relatively low-cost spindles which can be used make the machines practical even for moderate production runs of a variety of parts. And, often a single head can be designed for machining two or more similar parts. In the event of a change-over in work handled, up to 75% of an obsolete head can be

salvaged to make up a new one. There is no sacrifice in precision. Tolerances to .0002" for spatial relationship, shoulder depth, and hole size can be maintained by operators with ordinary skills — depending on size of part, shrinkage, expansion, material composition, tool maintenance, etc. Inspection requirements are greatly reduced because spatial accuracy is built into the head, fixtures, and machine itself.

Even change-overs take no special operator skills because the head mates with the machine spindle with foolproof simplicity. The workholding fixture is positioned quickly and simply in relation to the workhead. For complete information, ask for Bulletin No. D-224.

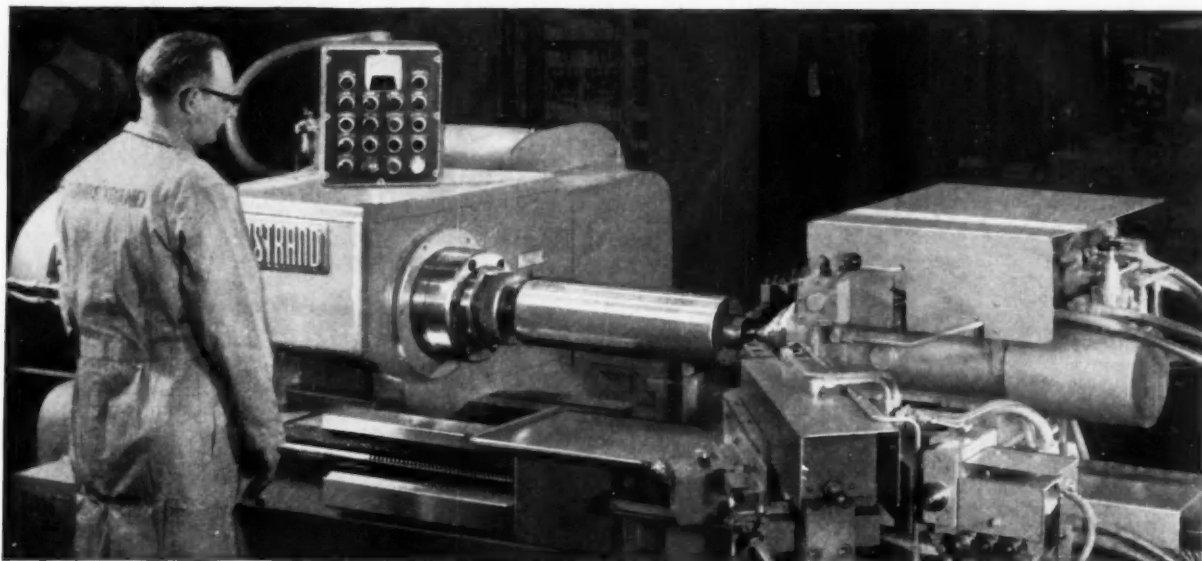
TRACER TURNING

— Sundstrand machine turns and faces parts in one-third the time of former method

This Sundstrand multi-cycle tracer lathe turns the outside diameter and faces shoulders of air compressor rotors three times as fast as equipment previously used. Ten different parts are produced in lot sizes aver-

aging 20 pieces. Whether for short or long runs, you can expect comparable economies when you replace obsolete turning equipment and methods with modern Sundstrand automatic lathes. A Sundstrand

"Engineered Production" Analysis will determine the machine and tooling that will provide you lowest possible manufacturing cost. For more details on Sundstrand Lathes ask for Bulletin T-224.



BROACHING AND MILLING

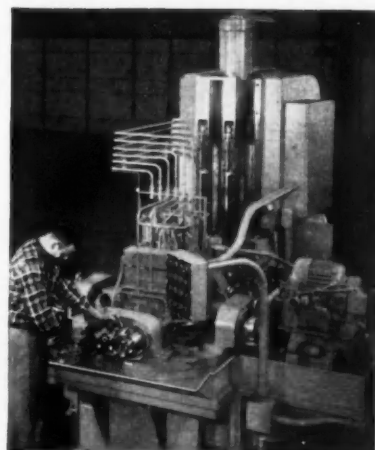
— one Sundstrand machine combines the two and cuts machining time 70%

A major opportunity for cost reduction in many shops lies in the use of multiple-operation machines. The part illustrated provides an excellent example. Formerly, the operations indicated required four machines. With the new Sundstrand machine which combines broaching and milling, parts are produced with 70% less machine time . . . reduced setup time . . . practically no rejects . . . less maintenance . . . less floor space . . . reduced operator fatigue . . .

elimination of unbalanced inventory . . . better quality standards . . . less handling between machines.

If you want to explore the opportunities for profitable multiple-operation machining in your shop, ask for details about a Sundstrand "Engineered Production" Analysis.

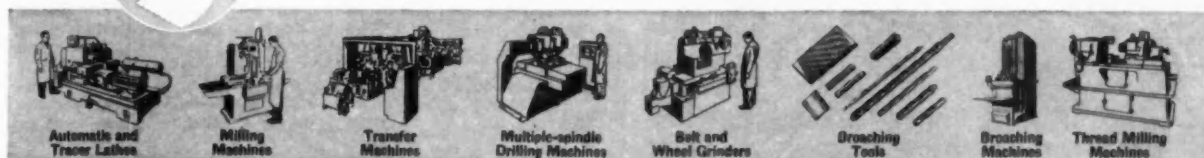
MILL BROACH



SUNDSTRAND MACHINE TOOL

BELVIDERE, ILLINOIS

DIVISION OF SUNDSTRAND CORPORATION



INDUSTRY STATISTICS

By Marcus Ainsworth, STATISTICAL EDITOR

WEEKLY U. S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

Make	Weeks Ending		Year to Date	
	Jan. 14	Jan. 7	1961	1960
PASSENGER CAR PRODUCTION				
Total—American Motors	4,346	4,346	20,594	
Chrysler	2,022	1,632	3,654	5,078
De Soto	3,510	378	3,888	2,748
Dodge	401	72	401	1,454
Imperial	695	108	767	18,572
Plymouth	4,309	2,986	4,417	8,103
Valiant	2,986		2,986	
Total—Chrysler Corp.	13,923	2,190	16,113	53,429
Comet	2,830	269	3,099	
Falcon	10,198	3,389	13,587	22,311
Ford	16,670	10,908	29,578	65,362
Lincoln	618	646	1,464	1,715
Mercury	1,729	2,296	4,025	11,752
Total—Ford Motor Co.	34,245	17,508	51,753	101,140
Buick	4,891	3,839	8,730	16,420
Buick-Special	1,937	1,419	3,356	
Cadillac	3,379	2,700	6,079	8,318
Chevrolet	27,989	22,268	50,264	77,796
Chevair	5,891	4,591	10,482	15,801
Oldsmobile	6,311	4,921	11,232	19,963
Olds-P88	1,667	1,659	3,326	
Pontiac	6,000	4,884	10,884	20,380
Tempest	3,394	2,651	6,045	
Total—General Motors Corp.	61,669	49,129	110,796	158,628
Total—Studebaker-Packard Corp.	1,021	961	1,982	6,610
Checker Motors				
Total—Passenger Cars	110,858	74,134	184,992	340,401
TRUCK AND BUS PRODUCTION				
Chevrolet	6,460	5,420	11,900	19,538
G. M. C.	1,332	1,057	2,389	4,349
Diamond T	25	23	48	153
Divco	60	48	108	160
Dodge and Fargo	1,372	1,081	2,453	3,700
Ford	5,973	4,878	10,851	18,289
F. W. D. Corp.	27	12	39	42
International	2,508	1,798	4,306	5,684
Mack	211	160	371	616
Studebaker				313
White				798
Willys	1,757	1,403	3,160	4,414
Other Trucks	70	70	140	145
Total—Trucks	20,119	16,172	36,291	58,201
Buses	75	50	125	200
Total—Motor Vehicles	131,052	90,356	221,408	398,602

NEW FOREIGN CAR REGISTRATIONS*

NOVEMBER		1959	
1960		1959	
Volkswagen	14,370	Volkswagen	10,048
Renault	2,785	Renault	8,486
Fiat	1,093	Opel	3,125
Mercedes Benz	1,084	Fiat	2,887
Volvo	1,034	English Ford	2,796
Triumph	999	Hillman	2,014
Opel	980	Simca	1,897
Simca	953	Vauxhall	1,889
English Ford	845	Triumph	1,425
Austin Healey	795	Volvo	1,311
All Others	7,561	All Others	11,901
Total	324,479	Total	47,779
ELEVEN MONTHS			
1960		1959	
Volkswagen	144,472	Volkswagen	104,954
Renault	60,322	Renault	82,906
Opel	24,453	English Ford	39,000
English Ford	22,883	Opel	36,610
Fiat	19,867	Fiat	35,539
Triumph	16,775	Simca	33,084
Simca	16,273	Hillman	26,442
Austin Healey	15,570	Vauxhall	21,770
Mercedes Benz	13,230	Triumph	21,577
Volvo	13,025	Volvo	17,037
All Others	119,581	All Others	140,280
Total	466,451	Total	559,201

TRACTOR SHIPMENTS

WHEEL TYPE		November	
Hp Ratings		November	Eleven Months
9-34 belt hp.		1,395	23,791
35-39 belt hp.		1,098	20,430
40-49 belt hp.		1,479	29,080
50-59 belt hp.		3,145	36,749
60 belt hp. and over		2,009	26,085
Total—Wheel Type		9,126 ¹	136,145 ²
TRACKLAYING TYPE			
20-59 net engine hp.		497	7,298
60-129 net engine hp.		424	7,406
130 net engine hp. and over		397	7,507
Total—Track Type		1,318 ³	22,311 ⁴
1—Valued at \$23,140,000			
2—Valued at \$305,009,000			
3—Valued at \$14,414,000			
4—Valued at \$259,340,000			

1960 NEW REGISTRATIONS*

Arranged in Descending Order According to the Eleven Months, 1960 Totals

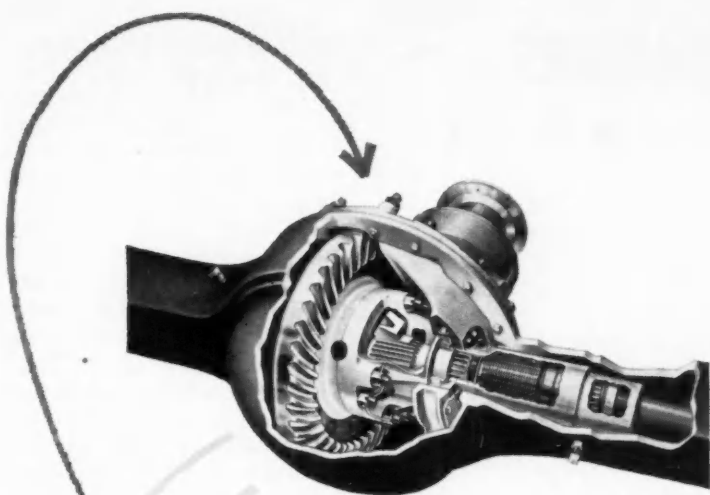
NEW CARS

Make	November		Eleven Months	
	1960	1959	1960	1959
Chevrolet	134,815	121,965	73,504	1,551,818
Ford	124,848	135,889	116,406	1,300,829
Plymouth	34,106	38,407	30,042	415,318
Pontiac	31,341	31,628	29,415	390,390
Dodge	31,904	32,458	22,271	363,441
Oldsmobile	26,272	30,385	20,388	334,277
Buick	34,361	33,287	21,226	321,352
Comet	29,147	23,298	18,610	240,311
Mercury	17,920	21,128		141,978
Cadillac	13,293	10,484	14,251	137,269
Studebaker	14,205	13,241	7,952	135,297
Chrysler	7,537	6,972	10,939	98,911
De Soto	7,353	7,156	5,403	71,953
Lincoln	1,194	1,252	2,457	21,937
Imperial	1,175	914	2,971	17,928
Misc. Domestic	1,733	1,758	2,050	14,848
Foreign	360	565	2,642	8,064
Total—All Makes	32,479	36,704	47,779	466,451
Total—All Makes	843,042	847,461	428,306	6,032,372

NEW TRUCKS

Make	November		Eleven Months	
	1960	1959	1960	1959
Chevrolet	24,670	23,977	17,690	291,173
Ford	15,832	22,254	26,752	258,408
International	8,455	8,018	10,520	102,833
G. M. C.	6,416	6,819	5,067	76,584
Dodge	3,595	3,769	4,015	40,086
Willys Truck	1,804	1,961	2,057	17,828
White	787	973	1,001	13,301
Mack	709	730	1,239	10,147
Willys Jeep	1,101	1,292	1,053	10,125
Studebaker	689	521	304	5,410
Diamond T	133	141	254	2,315
Brookway	99	77	108	1,006
All Others	2,997	3,536	3,649	41,032
Total—All Makes	67,477	74,158	73,909	870,248
Total—All Makes	67,477	74,158	73,909	880,041

* Compiled from official state records. Data property of R. L. Polk & Co. May not be copied, sold or reprinted without Polk permission.



**Rockwell-Standard®
Traction Equalizer...
puts
action
where there's traction!**

The Rockwell-Standard Traction Equalizer provides a substantial increase in tractive effort to the wheel with the best road adhesion. It is effective on a vehicle even if one pair of driving wheels has no traction. Provides safer, surer performance on or off the highway... easier control on curves, slippery pavement and soft ground. Eliminates tendency of vehicle to swerve when one wheel suddenly loses traction.

Automatic actuation. Doesn't depend on driver to start it working. Whenever one wheel tends to turn faster than the other, Traction Equalizer starts to work.

Tailored to your needs. With multi-drive axle vehicles, each axle may be equipped with Traction Equalizer units. No matter where your vehicles operate—on or off the highway—the Rockwell-Standard Traction Equalizer gives your vehicles better traction.

Self lubricating. Traction Equalizer automatically picks up standard axle lubricant and works it through unit.

Less maintenance. Normally, Traction Equalizer requires no maintenance between axle overhaul periods. It also cushions impact of heavy loads on tires, shafts and gears.



Another Product of...

**ROCKWELL-STANDARD
CORPORATION**



Transmission and Axle Division, Detroit 32, Michigan

1961 MARINE ENGINES

Display Marked Advances in Design

(Continued from page 46)

barrel downdraft carburetor, as well as a compression ratio of 8 to 1. Weight of this engine, dry and with direct drive, is 665 lb.

The two in-line engines are L-head type. One, the Model K, is a six-cylinder 229.7-cu-in. engine, rated 100 hp at 3200 rpm. The Model B is a four-cylinder 132.7-cu-in. engine, rated 60 hp at 3200 rpm.

Watercooled generators now are standard equipment.

Marine & Industrial Engine Div., Chrysler Corporation

With the addition of seven gasoline and four Diesel models, the Chrysler line of marine engines for 1961 has been expanded to a total of 17 models.

The seven engines of the new lower-cost "M" series comprise two six's and five V-8's, ranging in horsepower from 110 to 280. Model designation in each case indicates total piston displacement.

Six-cylinder models are the M-170, with a 3.4-in. bore and 3.125-in. stroke, rated 110 hp at 4000 rpm; and the M-225, with a 3.4-in. bore and 4.125-in. stroke, rated 120 hp at 4000 rpm.

There are three 318-cu-in. V-8's, with bores and strokes of 3.91 x 3.31 in. The M318A is rated 190 hp, M318C is rated 195 hp, and M318B is rated 210 hp at 4000 rpm.

The M-383 is a V-8 having a 4.25-in. bore and 3.38-in. stroke, rated 260 hp at 4000 rpm.

Biggest engine in the entire line is the new M-413, with a bore of 4.18 in. and stroke of 3.75 in., displacing 413 cu in., rated 280 hp at 4000 rpm.

The Diesels, named Chrysler-Perkins, consist of two four's and two six's, of the four-stroke, water-cooled type. Here again, the model designation indicates the piston displacement.

Model M-99D is a four-cylinder with a bore and stroke of 3 by 3½ in., rated 50 hp at 4000 rpm. M-

270D has four cylinders 4¼ by 4¾ in., and is rated 80 hp at 2000 rpm.

The M-305D Chrysler-Perkins Diesel has six cylinders 3.6 x 5 in., and is rated 102 hp at 3000 rpm. And the M354D has six cylinders 3.875 x 5 in., and a rating of 143 hp at 2800 rpm.

Prior gasoline models being continued are the six-cylinder Ace, Crown and Crown Special, and the eight-cylinder Sea-V, Imperial, and Imperial V-275. The Ace, rated 110 hp at 3600 rpm, has a total piston displacement of 230-cu in. The Crown and Crown Special displace 265 cu in., and are rated respectively 125 and 135 hp at 3600 rpm.

The Sea-V is a 318-cu-in. V-8, with a rating of 177 hp at 3600 rpm. The Imperial is another V-8, displacing 361 cu in., rated 225 hp at 4000 rpm; while the Imperial V-275 displaces 354 cu in., and is rated 275 hp at 4400 rpm.

Cummins Engine Co.

This builder of heavy-duty four-stroke Diesels is offering 25 models for marine applications, ranging from 70-hp workboat-duty rating to 1120 shp maximum in a multiple-engine configuration. Ten of the models are naturally-aspirated, six are supercharged, and nine are turbocharged.

During 1960, Cummins completely redesigned 10 of its H and NH models for lower profile, and introduced four new marine engines. The latter are the Models C-160, C-175, C-180, and NT-380. All are of six cylinders, and naturally-aspirated.

The C-160, C-175 and C-180 have bores of 4-7/16 in. and strokes of 5 in., for a total piston displacement of 464 cu in. Max bhp ratings range from 160 to 180 at 2500 rpm; and basic weights from 1920 to 2000 lb.

The NT-380 has a bore and stroke of 5½ by 6 in., and a total piston displacement of 855 cu in. Its max rated bhp is 380 at 2300 rpm.

Dearborn Marine Engine Div., Eaton Mfg. Co.

In the 1961 Dearborn Interceptor line of inboard gasoline engines are nine basic sizes of from 144 to 430-cu-in. displacement, with ratings from 85 to 275 hp. Two are six's and the remainder V-8's.

Additions this year are a six-cylinder of 170-cu-in. displacement and a V-8 of 390-cu-in. displacement.

The ohv six-cylinder has a bore of 3.5 in. and stroke of 2.94 in., and is rated 100 hp at 4400 rpm. Its compression ratio is 8.7 to 1; and weight 390 lb.

The new ohv V-8 has a bore of 4.05 in. and stroke of 3.784 in., is rated 260 hp at 4400 rpm, and weighs 860 lb. Compression ratio is 8.1 to 1.

Smallest engine in the line is a 144-cu-in. six with a rating of 85 hp at 4200 rpm. And the biggest is a 430-cu-in. engine, rated 275 hp at 4000 rpm. Intermediate displacements are 170, 256, 272, 292, 312, 352, and 390 cu. in.

Engine weights have been reduced through the liberal use of aluminum alloys in some of the components, such as oil pans, exhaust manifolds, and transmission housings.

The parent company of Dearborn—Eaton Mfg. Co.—recently introduced an outboard drive for use with inboard-mounted engines. Called the PowerNaut, it is being offered by Dearborn in a package with the 85-hp 144-cu-in. Interceptor, besides being offered by other engine builders.

This drive is supported from the engine, but is free to kick up when an underwater obstacle is encountered. It also tilts, swings laterally, and swivels 180 deg, as may be desired for beaching, trailering or maintenance; and can be completely removed from the boat by means of a single-lever disconnect.

Detroit Diesel Engine Div., General Motors Corp.

The 1961 line of this builder comprises marine versions of the Series 53, 71, and 110 two-stroke heavy-duty Diesels. There is an inclined model, in-line and V types.

Series 53 Inclined is a four-cylinder Diesel with a total piston displacement of 212.3 cu in. This engine is rated 130 hp max at 2800 rpm. Designed especially for pleasure craft, it has a height of 30 1/4 in., a width of 25-25/32 in., and a length with gear of 50-3/32 in. Weight is 1240 lb. The Series 53 marine engines, all of the same 3 7/8-in. bore and 4 1/2-in. stroke, also come in two, three and four-cylinder vertical models, and in a six-cylinder V model, with max ratings from 20 to 195 hp.

The Series 71 marine Diesels are available in three, four and six-cylinder vertical models; six, eight, 12 and 16-cylinder V models; and in 12-cylinder twins and 24-cylinder quads. Power ratings range from 118 to 1008 hp at 2300 rpm.

The Series 110 is a six-in-line, with a total piston displacement of 660 cu in. It has a max rating of 309 hp at 2000 rpm.

Gray Marine Motor Co.

Four new "compact" models are in Gray Marine's 1961 line of 23 gasoline and 6 Diesel inboards.

The "compacts" consist of a four-cylinder 162-cu-in. engine, rated 80 hp at 3800 rpm; a six-cylinder 226-cu-in. engine, rated 111 hp at 3600 rpm; and two V-8's with displacements of 250 cu in., rated 138 hp at 4200 and 178 hp at 4400 rpm. These engines are built with the flywheel at the forward end; and aluminum has been used extensively to reduce weight.

The 80-hp four and the 111-hp six are available as package units with the new Eaton Pownaut outboard-type drive, and also as "bob-tail" units, without reverse gear, for use with other types of stern drives and "jet propulsion."

Smallest gasoline model in the Gray line is the Seascout-91, a four-cylinder 91-cu-in., rated 25 hp at 2000 rpm. The largest gasoline model is a V-8 of 327-cu-in. displacement, rated 238 hp at 4400 rpm.

Piston displacements of the seven four's range from 91 to 162 cu in., and the ratings of these engines from 25 to 85 hp. There are nine six-cylinder models with displacements ranging from 226 to 427 cu in. and outputs from 109 to 200 hp.

The V-8's are made in seven models, in two displacements of 250 and 327 cu in., with ratings from 135 to 238 hp.

The Diesels are offered in four and six-cylinder models—three of each. The four's have displacements of 129, 157 and 277 cu in., with max ratings of 25, 30 and 60 hp. The Diesel six's have piston displacements of 427, 572 and 802 cu in., and max ratings of 130, 150 and 190 hp.

P&H Diesel Engine Div., Harnischfeger Corp.

Development of a brand-new, lightweight high-speed Diesel is the highlight of this maker's line of marine inboards for 1961.

The new engine, designated the P&H Model V-463, is a two-stroke, 90-deg V-4 Diesel with a bore and stroke of 4 by 5 in., giving a total piston displacement of 252 cu in. Its max rating is 135 hp at 2800 rpm.

Aluminum is used in most major components, such as crankcase, cylinder heads, flywheel housing, and blower. Basic weight of the engine is 780 lb.

Poppet valves are not employed in the loop scavenging design of this engine. Intake and exhaust are through porting in the wet-type cylinder liners.

Palmer Engine Co.

A new marine Diesel, representing a major departure for this long-established supplier of gasoline marine inboards, marks the Palmer line for '61.

Based on a six-cylinder International-Harvester light-truck cylinder block, the Palmer IH-D301 marine Diesel displaces 301 cu in. and has a pleasure-boat rating of 110 hp at 3000 rpm. Its commercial rating is 95 hp at 2800 rpm, and continuous rating 85 hp at 2600 rpm. Bore and stroke are 3.8125 x 4.39 in.

Fresh water cooling is standard equipment. A front PTO is available as optional equipment, rated 30 hp.

Universal Motor Co.

Four 1961 innovations are being offered by Universal in the form of two inboard-outboard packages and two new V-8 gasoline engines.

The inboard-mounted-engine with outboard-type-drive combinations are designed around the Universal 70-hp Unimite Four and the 113-hp Bluefin engines. The former is a four-cylinder L-head engine displacing 141 cu in.; and the latter a six-cylinder L-head engine displacing 230 cu in. Power ratings are at 3500 rpm.

One of the new V-8's, called the Universal Little King, has a bore and stroke of 3 7/8 by 3 in. and a total piston displacement of 283 cu in. It is rated 188 hp at 4000 rpm. Weight of this ohv engine, with direct drive, is 665 lb.

The second new ohv V-8, named the Universal Big King, has a 4.3-in. bore and 3.7-in. stroke, for a total piston displacement of 430 cu in. This model is rated 277 hp at 4000 rpm; and weighs 1022 lb with direct drive and hydraulic reversing gear.

Waukesha Motor Co.

This prominent builder of engines in the heavy-duty class has a series of seven ohv marine Diesels ranging from 302 to 5788-cu-in. displacement with max 24-hour-duty ratings from 65 to 1100 hp.

All models are available either naturally-aspirated or with turbocharger; and the two largest also are obtainable turbocharged with intercooler.

Six of the models, with piston displacements of 302, 426, 779, 1197, 1905, and 2894 cu in., are six-in-line. Horsepower ratings are 65 (85 turbocharged), 100 (120 turbocharged), 150 (195 turbocharged), 195 (290 turbocharged), 240 (315 turbocharged), and 335 (510 turbocharged, 600 with intercooler). Weights range from 1550 lb to 10,200 lb.

The largest Diesel is a V-12 with a "square" bore and stroke of 8 1/2 in., totaling 5788 cu in. It has a continuous rating of 725 hp normally-aspirated, 990 hp turbocharged, and 1100 hp turbocharged with intercooler, at 1215 rpm. Its basic weight is 15,500 lb.

A hint to the future: Waukesha indicates it is currently developing a new concept of gas turbine that is expected to lead the way for gas turbine applications in the work-boat field. ■

METALS

*Increased Orders for Steel Foreseen as Scrap Prices Rise.
No Nickel Shortage Expected, Although Consumption Is Up.*

By William F. Boericke

Steel Trade Is Cautiously Optimistic

The January pickup in the steel industry has been mild but it was definitely perceptible. Incoming orders rose from many consumers. It was felt that this improvement came from customers who had finally finished their inventory cutting and were buying steel for their actual uses. This was emphasized by Armco's president who looked for production to move ahead considerably over its present level with a better balanced quarterly average. In his opinion the story of steel in 1961 will be the reverse of last year with steady improvement in the second half of the year instead of a recession. While the rise in the first quarter quite likely will be minor and spotty, by April or May a gain of about 20 per cent is not too much to expect.

Scrap Prices Advance

Perhaps the most cheering omen for the industry has been the sudden spurt in the prices of steel scrap which is still considered by many as a barometer of the steel industry. Scrap is showing strength it hasn't enjoyed for well over a year. Almost as soon as 1961 was welcomed in, the steel scrap market started to move up in all important consuming areas. By mid-January the composite price had advanced about \$10 a ton over last month. The key grade No. 1 heavy melting scrap had topped \$40 a ton.

Gratifying as this is, not all the credit can be given to demand from the steel mills, and it is generally believed that export demand accounts for most of the new activity. While domestic consumers of scrap do not appear to be giving the

market much support, both Europe and Japan have been heavy buyers. Nevertheless the very fact that astute foreign purchasers have entered the scrap market in a substantial way has no doubt caused domestic users to consider replenishing their own depleted supplies at what are comparatively bargain prices for their own protection. The scrap trade, from practical experience and intuition, has been able over the years to sense a change that is first made evident in its own market and is later shown by increased strength in the whole steel market. The present activity in scrap is not likely to contradict this historical precedent.

New Index For Steel Activity

While the steel industry has stopped giving out figures which disclose the weekly operating rate as related to industry capacity, it now proposes to replace them with a new index which will be related to average U. S. weekly output for 1957-59 of 1,863,000 tons taken as 100.0. It is declared that this will give a truer picture of the condition of the industry than a percentage of theoretical total operating capacity, roughly 148,570,000 annual rate as of today, which includes considerable obsolete facilities that can only be reactivated in time of intense demands. Be that as it may, the loss of the old established barometer is going to be sorely missed by steel analysts.

Base Prices for Steel May Remain Unchanged

Any hope that higher base prices for steel would be established early in 1961 appears to have gone aglimmering. Intense competition both within the industry and from abroad makes such a step unfeasible. Indeed there are some signs of the opposite. Kaiser Steel, a major

West Coast producer, has announced a cut in the price of electric-weld steel pipe, which represents the first base price reduction in a big tonnage steel mill product by an important producer in years. No doubt this was made to meet foreign competition, mainly from Japan, in the California market. Wire products and nails have been especially vulnerable as well.

Nickel Consumption To Increase

Nickel consumption in this country totalled over 215 million lb in 1960, according to a Government estimate. Consumption in 1961 will probably be higher, depending on the rate of automobile production. But there will be no shortage. International Nickel will bring in an increased output from its new Thompson mine which will easily compensate for the loss of Cuban production. Demand from Europe has been very strong. While the price of nickel was advanced in Canada to the level in this country it is not expected that the domestic price will be changed. An official of Union Carbide foresees stainless steel output up about 10 per cent in 1961, a substantially better increase than that projected for carbon steel. Stainless steel provides the largest market for nickel.

Aluminum Production Rate Low

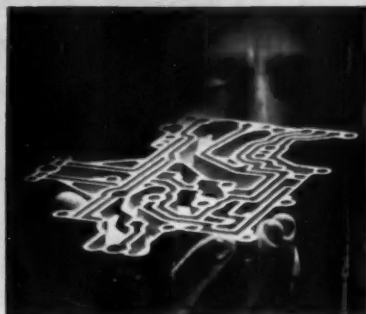
It now appears that the current level of production in the aluminum industry, at present the lowest for a year, may decline further in the first quarter. It is officially estimated that a softened demand has trimmed output of established potlines so that about 22 per cent of capacity is now unused. However, a modest increase in shipments of mill products is expected for early 1961. ■

Aluminum Problems?

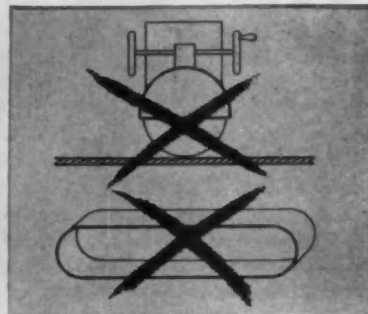
See how the LAPMASTER can lick 'em...



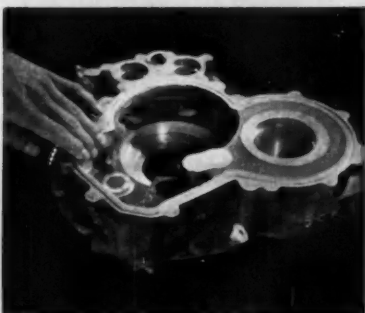
CLAMPING ELIMINATED. Aluminum, magnesium and all non-ferrous metals can't take clamping without warp or distortion. The Lapmaster eliminates this serious problem because flat surfaces are lapped in a free, unclamped state. Flatness checks show that the Lapmaster consistently produces surfaces to extremely close tolerances... even irregularly shaped parts, like those above, pass the most rigid inspection for flatness.



"AS-CAST" WARPAGE REMOVED FAST. Lapmasters quickly rectify "as-cast" warpage on flat surfaces of non-ferrous metal parts. Lapping produces the true, flat reference plane desired for subsequent machining. In other instances where parts become distorted due to clamping and chucking operations, a short, follow-up cycle on a Lapmaster will return the surfaces to their original flat condition.



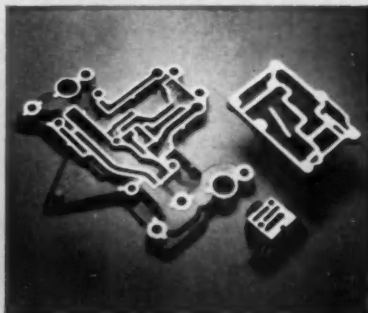
GRINDING PROBLEMS VANISH. There is no such thing as "lap plate loading". If you've tried grinding or belt sanding aluminum or magnesium, you know how fast the wheels load... how difficult and costly it is to prevent surface gouging, ripping or tearing. But with the Lapmaster method of stock removal, you never face such problems. Instead, you get uniform accuracy and a scratch-free finish, piece-after-piece.



NO MORE BURRS. After lapping on a Lapmaster, burrs just don't exist. Finger testing proves it every time. Lapping eliminates the expense of subsequent hand deburring operations and helps reduce inspection costs. This advantage is especially important in the finishing of pump, compressor or engine parts or on parts incorporating "O" ring groove on the face.



FAST STOCK REMOVAL. Lapping of non-ferrous metals on a Lapmaster is a finishing method that saves time and money for hundreds of manufacturers. Stock removal rates are high. Other methods requiring expensive tooling still cannot match the accuracy of lapping. And Lapmasters do it right the first time, every time.



PERFECTLY MATED SURFACES. In many cases, Lapmasters eliminate difficult gasketing problems by lapping mating surfaces to microinch finishes of 2 to 3 AA, to flatness within one light band (.0000116") or less and parallelity of exacting tolerances. The Lapmaster, for example, produces mating surfaces on aluminum transmission parts that will hold oil at 200 psi. Its uniform accuracy also eliminates selective assembly.

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NEW

PRODUCTION and PLANT

EQUIPMENT

By C. J. Kelly
ASSISTANT EDITOR

FOR ADDITIONAL INFORMATION, please use reply card at back of issue

Gas Powered Stand-Up Lift Truck

CALLED the Stand-Up, a new truck is available in two models, the C20-SU and the C25-SU. These are rated at 2000 and 2500 lb capacity at 24 in. load centers. Both models are powered by a four cylinder, L-head engine of 112 cu in. displacement. Forward or reverse speed is 8 mph maximum. The C20 will climb a grade of 27 pct loaded, and the C25

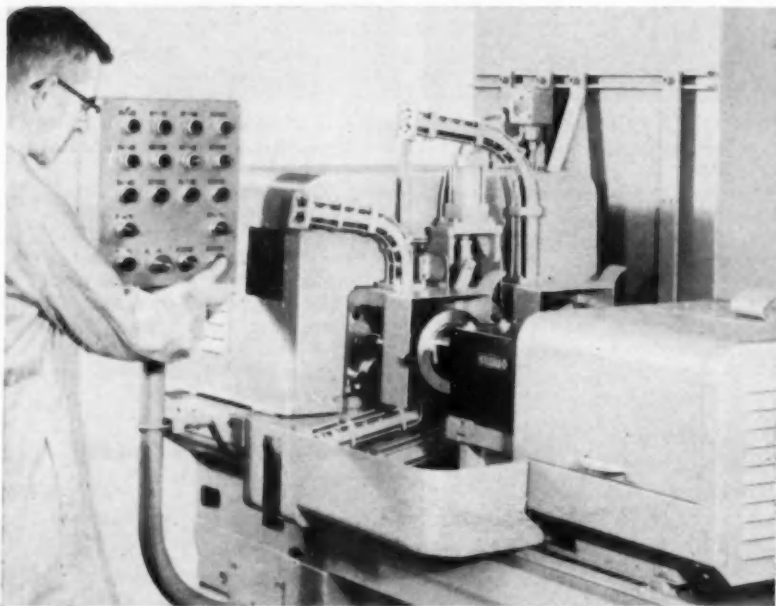
a 23 pct grade with rated load. The trucks are 32 in. wide and have a 62 in. turning radius. The aisle for right angle stacking is 72 $\frac{1}{2}$ in. plus load length. Full 360 degree steering allows the truck to pivot on the center of the inside drive wheel for quick maneuvering. Lift speeds are 75 fpm loaded and 90 fpm empty. Lowering speeds are 60 fpm loaded and 80 fpm empty. *Industrial Truck Div., Clark Equipment Co.*

Circle 41 on Inquiry Card for more data

Automated Boring Machine Makes Transmission Parts

ONCE initiated, the operation is automatic and continuous. Fast-acting air cylinders operate the work handling mechanism. Gravity-fed parts are precisely and quickly located and clamped. Boring is completed in 9 seconds. The finished parts are released and dropped into a discharge chute as the next cycle commences.

Accuracy of bore size is held to within 0.0006 inch while the bore is held square to the faces of the part within 0.0003 inch. A quill having a micrometer adjustment facilitates rapid and accurate tool setting. An automatic quill movement permits the tool to clear the workpiece to eliminate drawback lines. *Ex-Cell-O Corp.*



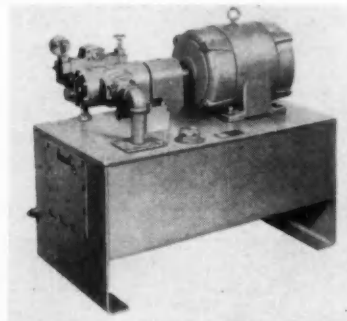
This automated precision boring machine finish bores the internal diameter of automotive transmission planet carrier blanks at the rate of nearly 400 per hour.

Circle 43 on Inquiry Card for more data

Double Pump Units

DDOUBLE pump power units for general industrial use have been designed in a new 1000 and 2000 psi line. They are offered in standard 30 and 60 gallon reservoir, with combined pump capacities to 33 gpm. All units incorporate an 1800 rpm motor.

By utilizing double pumps in conjunction with the "Hi-Lo" Unload-



ing Valve Panel, horsepower requirements are reduced, oil temperatures are lowered, and maximum circuit efficiency is realized. Hannifin Double Pump Units give ideal service in situations where rapid advance and slow, constant feed is desired. "DCP" power units can also be supplied with two individual relief valves instead of the "Hi-Lo" Panel, when two separately operated hydraulic systems are required. *Hannifin Co.*

Circle 42 on Inquiry Card for more data

Finishing Machine

A COMPACT, self contained vibratory finishing machine has a work container capacity of 1 $\frac{1}{2}$ cu ft. Known as the 1 $\frac{1}{2}$ YA, this unit is designed for a wide range of applications on metal, ceramic and plastic parts. Featured is a mechanical motion control for infinite variation of frequency over the available range while the machine is running.

The rubber lined work container holds up to 500 lbs of media and work pieces and is supported by a system of air cushions. Amplitude as well as frequency is variable. *Pangborn Corp.*

Circle 44 on Inquiry Card for more data

Tomorrow's Transportation

(Continued from page 43)

So we now had our scale model vehicles in their carriers traveling on Stainless Steel tracks, supported on simple pylons.

Now, we felt, our monorail track should run through a symbolic city of the future. Here, we were faced with a problem of how much detail can you put into a small model? Everyone knows that Stainless Steel is used for windows, entrances, and curtain walls and for entire buildings, but how to show it? We decided that on a model this small, it would be impossible to do justice to this problem, so we would treat the entire city as merely an aesthetic suggestion of the architecture of tomorrow. By making it thought provoking and the type of display that creates a great deal of discussion, we could accomplish our overall purpose. So we built a small scale section of a city of the future that clearly indicated it was not of this era, but of the future and made it as interesting as possible.

You might say this was stepping out a bit too far but then this was a display and the primary purpose of a display is to stop people, have them look, become interested and discuss what you are showing. If they ask questions about it, all the better, because we have a very fine colorful brochure depicting the entire story in Stainless Steel for their edification.

READY FOR THE SHOW

Now we have completed the design, engineering and actual building of the full-size vehicle, the display floors, walkways, end caps (with their displays) complete roof structure with lighting, monorail track system with its scale vehicles and the scale city of the future. In addition, the entire story has been graphically and colorfully told in the brochure and we are ready for the show.

Now, of all the work on this project, by far the most exacting, time consuming and, of course, most exciting was the monorail vehicle itself. Named the XV'61 (for Experimental Vehicle of 1961) this had to be a completely different package than anything on the highways today. Still, it had to fill the same requirements of today's personal cars and be able to travel the monorail. There was also one problem that was unique with this project. The McLouth management did not want to imply that they were in any way attempting to suggest or influence the future design of automobiles. So this vehicle had to be merely a way of showing the many different uses of Stainless Steel in practical applications.

A FOUR-PLACE VEHICLE

THE results were (as shown in the photos) a four place, rear-engined vehicle, fifty-nine inches high and one hundred and seventy inches long—of an un-

usual, but intriguing profile. It was deliberately made higher than today's cars for easy entrance and exit, without requiring any complicated doors into the roof. The front wheels are small for allowing easy turning and entrance and the rear wheels large to carry the load and give added traction.

The rear door is extremely large for easy entry into rear seat and package area and both doors hinge on the "B" pillar. The driver sits right up front with large glass areas for excellent driver visibility and because of the rear engine, there is no tunnel to climb over. The instruments are in two pods—one mounted on the steering column near the panel and one overhead on the centerline of the roof. This overhead instrument pod is very accessible and yet out of the way. It is quite similar to aircraft controls. The seats are high and contoured giving full body support and are supplemented with pull-down arm-rests in door inner panels. These can be pushed out of the way when not required. The exterior of the XV'61 has recessed front and rear Stainless Steel bumpers of a new design that include a rubber scuffing center section and is backed up by a heavy carbon steel channel to take jolt type impacts. The headlights, taillights, front and rear license plates are all recessed in a sculptured form into the main body. The entire sheet metal surfaces are Stainless Steel, those below the peak in vital areas being brushed natural and those above being painted transparent blue over Stainless. This makes a most practical combination and is striking in its overall appearance.

The wheels are cast Stainless Steel with the high sections of the cooling fins being buffed and polished and the recessed areas painted a flat gray for depth. The center carries a beautiful symbol in color as an accent and really sets off the entire assembly.

Every detail on the vehicle has had a great deal of creative thought applied to it as is exemplified by the windshield wipers. These are rather large blades, which, when in use, make a large cover pattern on the glass when in stored position, nestle beautifully into an inconspicuous compact Stainless bar assembly.

Every installation of stainless has been illustrated on this vehicle, from mufflers to roof bows, structure to door handles, engine dress-up packages to trim mouldings.

In general, this vehicle is the type of transportation we could have tomorrow. It's practical, compact, versatile, comfortable, easy to get into and out of, carries a great deal of luggage and would be a pleasure to drive. We feel that although some people may find it controversial, it is ideal for our purpose of exciting discussions—discussions of Stainless Steel.

So that's the story of our special project. We hope you will see it in one of the many shows it will be in around the country, but if you can't, at least obtain a brochure and see how you like it. When you do, write us and let us know. We'd be pleased to hear from you and your comments may help us design the next project. One thing we do know, as a display, it is exciting, it does tell a story in a dramatic way and it is feasible. You may be seeing it in your future! ■

NEW

PRODUCTS

AUTOMOTIVE-AVIATION

FOR ADDITIONAL INFORMATION, please use reply card at back of issue

By C. J. Kelly
ASSISTANT EDITOR

Breakerless Ignition

A new ignition system has been developed to eliminate contact points and condensers. This end was accomplished through the use of electronic circuitry. According to Herman L. Hartzell, Delco-Remy's Chief Engineer, this development is under study for application on heavy-duty equipment such as stationary engines, trucks and tractors. It was reported that the pulse-controlled unit is not subject to the wearing, pitting, and oxidation which is characteristic of contact points in the conventional distributor, and which has always required periodic replacement along with the servicing of the ignition system.

One of the electronic system's first test applications has already run 5,000 hours and is still in operation without need of ignition maintenance. Delco-Remy Div., General Motors Corp.

Circle 48 on Inquiry Card for more data

Polybutadiene Tires

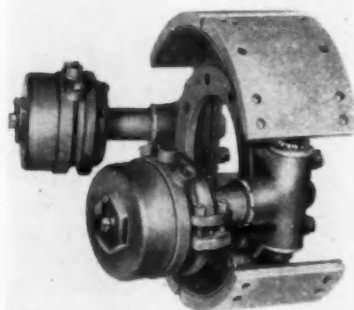
Truck tires are now being produced with treads containing a blend of polybutadiene synthetic and natural rubber. The manufacturer reports that the tires run from 15 to 20 deg cooler and give approximately $\frac{1}{2}$ more milage than tires made from all-natural-rubber or polyisoprene treads. Also, the new blend is claimed to have excellent crack-resistant qualities. United States Rubber Co.

Circle 49 on Inquiry Card for more data

New Brake Design

A new concept in commercial vehicle brake design, known as the Stopmaster, is available in 15 in. diameter and widths from 2 $\frac{1}{4}$ to 7 in. The new design allows the standardization of a 15 in. brake diameter for virtually any application. Larger sizes are available for special equip-

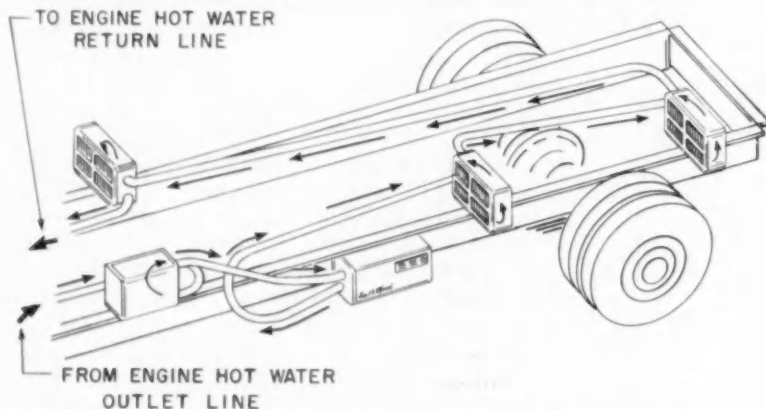
ment, earthmoving and construction use. By interchanging the actuator units the Stopmaster can be either air or hydraulically actuated. All actuating parts are enclosed and lubrication sealed. The manufacturer reports the new brake to be equally suited to straight air, straight hy-



draulic, air-over-hydraulic or vacuum-over-hydraulic. An important feature of the brake is the Fail-Safe chamber, which provides normal air operation and a mechanical parking brake. Primary purpose of this chamber is to prevent runaway vehicles due to loss of air whether parked or in operation. Rockwell-Standard Corp.

Circle 50 on Inquiry Card for more data

Thermostatically-Controlled School Bus Heater



A new auxiliary combustion heater has been developed for application on school buses. This unit will keep coolant temperatures in the 155 to 180 deg range. It will hasten engine warm-up from a cold start and will keep the engine at the proper temperature even while idling. The unit only operates when the engine is unable to keep the coolant at a temperature which will provide adequate heat for all requirements. Heating capacity of the school bus heater is 50,000 BTU/hr. South Wind Div., Stewart-Warner Corp.

Circle 51 on Inquiry Card for more data

Plastic Instrument Cluster

The Buick Special, introduced as the Buick division's entry to the small car field, has a dashboard instrument cluster molded from a high-impact plastic that is wired with a printed circuit. The cluster is molded from Kralastic, an ABS plastic.

Plastic was selected for this application because, according to the report, it has cost and weight saving advantages, and because its non-conductivity makes possible the use of a printed circuit.

Rigorous tests were made of a prototype plastic cluster before it was put in production. A car equipped with the prototype unit was driven for 25,000 miles on GM's desert prov-

ing grounds, and a dashboard with the cluster attached was whipped through a series of shake tests in a large vibrating machine. In a heat resistance test the cluster withstood 220 deg F. Other tests were made on its impact strength at various temperatures.

The cluster, molded in three sections and then joined with self tapping metal fasteners, weighs 2.3 lb and is produced in a basic color which can be painted to match the color scheme of the car. *United States Rubber Co.*

Circle 52 on Inquiry Card for more data

AUTOMATION News Report

(Continued from page 55)

a separate thin magnetic film control memory with several internal features which enable the user to gain additional speeds beyond those built in by electronic circuitry. These features include 16 arithmetic registers, 15 index registers with automatic incrementation, and partial word transfer capabilities. The new Univac 1107 accesses its film memory more than 1,000,000 times per second in normal operation. Its two large banks of core memory are accessed up to 500,000 times per second.

In addition to the film memory the system employs a ferrite-core memory of from 16,384 to 65,536 words, depending on the requirements of the user.

The thin magnetic film memory, a development which Remington Rand Univac scientists perfected after seven years of intensive research and which represents a major breakthrough in the field of electronic data processing, enables the Univac 1107 to attain internal referencing rates of speed measured in billionths of a second, as compared to the millionths of a second for previous computer systems. For example, the cycle time (time required to read and write information from the Univac 1107 computer thin-film memory is only 0.6 microseconds, as compared with the cycle time of ferrite-core memories (most advanced previous memory design) of 1.5 microseconds. ■

Passenger Car Makers Using More Zinc Die Castings

(Continued from page 51)

problem has been compounded by the increase in road salt and "dirty" atmospheres.

An effective weapon against this problem is the use of galvanized or coated steel. Galvanizing increases life span of automotive parts as much as three times that provided by low-carbon steel.

Of primary importance is the principle of electrolytic corrosion. When normal impact and erosion cause breaks in the zinc, an electrochemical process (in the presence of moisture) causes the zinc to act as an anode to the steel, sacrificing itself slowly and inhibiting the formation of rust.

The Ford Motor Co., after an exhaustive program of evaluating all known methods of corrosion protection for unitized construction, reported: "Of all the materials tested in this program, galvanized had the greatest life-span."

The entire Ford line today uses galvanized steel exclusively for structural underbody members, body cross members, rear engine cross members, inner, outer and

lower rocker panels, rear floor side panels, front torque boxes, rocker extensions, sheet metal around the radiator.

Ford uses some 22 lb of galvanized steel for its Fairlane rocker panels; 220 lb go into the Lincoln; 30 lb on the Mercury, another 200 lb on its Thunderbird.

In addition to galvanizing, automobile makers have found that zinc chromate primers as well as zinc-
(Turn to page 69, please)

TABLE III

GALVANIZED STEEL SHEET TO AUTOMOTIVE INDUSTRY

Year	Tons	Number of Trucks + Plus Cars	Avg. Lbs./Unit
1955	87,408	9,169,276	19
1956	91,057	8,920,590	26 1/4
1957	124,196	7,220,520	34 1/2
1958	133,215	5,135,106	52
1959	158,280	6,717,399	47
1960 (est.)	212,304	6,500,000 est.	65

TABLE IV

ZINC DIE CASTINGS IN 1961 FULL-SIZE CARS

Autos	F	F-D	D	1961 Total	1960 Total	Change
GMC						
Buick—Le Sabre (4 dr. hardtop).....	10.17	83.18	37.59	130.94	108.93	+22.01
Cadillac—(4 dr. hardtop).....	14.72	104.30	2.56	121.58	99.13	+32.45
Chevrolet—(4 dr. hardtop).....	14.95	30.50	31.27	76.72	55.14	+21.58
Oldsmobile—'68 (4 dr. hardtop).....	15.37	78.12	21.64	115.13	91.30	+23.83
Pontiac-Bonneville (4 dr. hardtop).....	8.78	64.94	11.77	75.49	83.35	- 7.86
FORD MOTOR COMPANY						
Fairlane (4 dr. hardtop).....	11.11	43.46	7.99	62.56	62.19	+ .37
Lincoln-Continental (4 dr. hardtop)...	4.97	105.11	43.06	153.14	108.71	+44.43
Mercury (4 dr. hardtop).....	10.65	57.99	13.14	81.78	87.28	- 5.50
Thunderbird (2 dr. hardtop).....	7.37	51.16	8.88	67.41	59.72	+ 7.69
CHRYSLER CORP.						
Chrysler-Imperial (4 dr. hardtop).....	3.73	93.76	74.73	172.22	92.73	+79.49
Chrysler-Newport (4 dr. hardtop).....	3.80	54.93	13.98	72.71	—	+ 1.91
Dodge-Polaris (4 dr. hardtop).....	7.30	33.69	.65	41.64	58.225	-16.585
Plymouth (4 dr. hardtop).....	6.92	38.23	.36	45.51	44.06	+ 1.45

F.....Functional
F-D.....Functional-Decorative
D.....Decorative

**PROTECTS
THE
PERFORMANCE
YOU
PROMISE!**

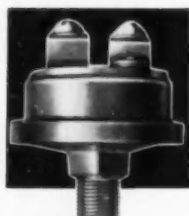


Hobbs HOUR METERS

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A recommended program of planned maintenance based on **OPERATING TIME** promotes better care of your product through correct attention at the right time — helps protect its reputation for top performance and dependability.

HOBBS HOUR METER is a true electric timing instrument which shows operating time in hours and minutes. No revolution counter can give a reliable indication of total engine time in all speed ranges. These efficient elapsed time indicators can also provide a realistic basis for buying and selling used equipment — show the actual running time of leased equipment. Ideal for warranties and service contracts. Models available for Alternating Current and Direct Current.



COMPLETE LINE OF PRESSURE SWITCHES

Industry approved for a wide range of applications — single circuit and dual circuit; grounded and non-grounded; preset pressure ranges of from 3 to 60 psi. Prefested at 150 psi.

Also manufacturers of shock-mounted head, tail and dash lights for off-the-highway equipment.

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**ON OUR
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Criticism of the government's "neglect" of small business is resounding in Congress. Legislation for tax adjustments to aid small business and a number of changes in antitrust and small business laws may be the outcome.

A cut in corporation income tax payments may yet get the support of President Kennedy. He will not back a cut in the 52 per cent tax rate. But now he is thinking of a tax deduction for amounts companies invest in new plant and equipment. The tax break would be a percentage of the amount spent for increased plant and equipment each year. Tax advisors have suggested such a write-off to spur business expansion.

As usual, Sen. Estes Kefauver (D., Tenn.) has introduced a pre-merger notification bill in Congress. It is the fourth year in a row that the antitrust committee chairman has backed the legislation. The bill would require advance notice to Federal agencies of corporation mergers if combined assets involve more than \$10 million.

Companies which have lost property through seizure by Cuba may get income tax deductions on these losses. Rep. Hale Boggs (D., La.) has introduced a bill to permit U. S. corporations and citizens to claim the property loss as a tax deduction even though it may be possible for them to recover the value by the Cuban government returning the seized property. Boggs' bill applies both to outright owners of seized property and persons owning stock or other interest in it.

Exports and imports of steel mill products climbed in November, according to the latest statistics of the Dept. of Commerce. Exports were up 23 per cent over October. Imports rose only a third as high, after dropping in October. A total of 284,000 tons was exported in November. That is 53,000 tons more than the previous month. Imports totaled 199,000 tons, a gain of 19,000 tons over October.

The four top jobs in the Labor Dept. have been split between union men and men with experience in labor relations. Filling the four top spots are: William Wirtz, Adlai Stevenson's law partner, as Undersecretary of Labor; James J. Reynolds, a management consultant, as an assistant secretary; Jerry R. Holleman, president of the Texas State AFL-CIO, as an assistant secretary, and Mrs. Esther Peterson, legislative representative of the AFL-CIO Industrial Union Dept., as assistant to the secretary and director of the department's Women's Bureau.

The National Labor Relations Board will soon be under the investigative eye of Congress. The House Labor Committee, apparently with the backing of President Kennedy, has decided to probe the board's policies.

More Zinc Die Castings

(Continued from page 67)

duct paints have been effective corrosion fighters.

In 1961 compact models, the Buick Special, Chevrolet Corvair, Oldsmobile F-85, and Pontiac Tempest each use some 45 lb of galvanized steel, plus an additional 15 lb of zinc-rich paint. Ford's Falcon utilizes 115 lb of galvanized, plus 5 lb of zinc-rich paint; the Mercury Comet uses 120 lb of galvanized, plus 5 lb of paint, and American Motors uses some 12 lb of galvanized per unit for miscellaneous applications.

The automobile industry's increase in consumption of galvanized is shown in Table III.

Several years ago the American Zinc Institute initiated a vigorous effort to develop more effective uses for zinc and improve related production practices. The new plating techniques noted above were (and still are) part of this continuing program.

Other areas in which the AZI is working to "nail down" established markets and build new ones include:

- improved production techniques for spot welding galvanized sheet
- new die casting alloys
- new and improved zinc-base paints

A promising youngster called "Zamak 7," recently announced by New Jersey Zinc, was developed through tighter control of impurities, a smaller dose of magnesium and the addition of a small amount of nickel. Reportedly, the new alloy will make it possible to boost production speeds, cut rejects and improve surface finishes. Latest reports indicate that larger, more complex castings with thinner wall sections are now possible.

In putting the "human capital" and competitive efficiency of platers, die-casters, material suppliers and automotive specialists under one umbrella, the zinc industry offers a novel view of how to successfully hurdle the material barriers thrown up by some of the newcomers. ■

Manufacturers' News

Argentine Venture

Rockwell-Standard Corp. and Artisma S. A. I. C. have announced a joint venture to produce suspension springs for Argentine subsidiaries of U. S. and European auto and truck manufacturers. They plan a factory near Buenos Aires.

Bearings Outlook

Production of anti-friction bearings in 1961 may decline slightly from the 1960 level, the Business and Defense Services Administration, U. S. Department of Commerce has reported.

Dollar volume and units produced by the industry have increased steadily since World War II, as evidenced by the following data (value in \$1000; quantity in 100,000 units):

Year	Value	Quantity
1944	416,875	347
1952	580,000	435
1957	684,561	481
1958	587,533	401
1959	813,909	553
1960*	423,348	274

* (First six months)

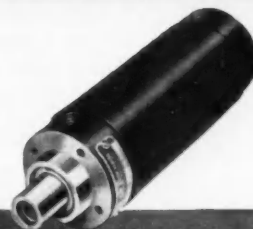
Budd Expansion

An expansion program at its Gary, Ind., plant has been completed by the Budd Co. The plant produces body assemblies for all American Motors Corp. models. The expansion assures an increase in output from 1400 daily to 2000. The addition adds 70,000 sq ft of floor space, bringing the total floor area to more than 600,000 sq ft.

Muffler Explained

R. E. Sutherland, senior vice president, Universal Oil Products Co., Des Plaines, Ill., appeared recently before the California State Motor Vehicle Pollution Control Board to explain workings of his firm's Purzast catalytic muffler. Mr. Sutherland presented charts to show how his firm's muffler cuts down partially burned and unburned hydrocarbons. Universal Oil has manufacturing facilities at Shreveport, La., and McCook, Ill.

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Internal Key Tie-Rodless Type Series 101A. Air—150 psi—up to 1500 psi Hydraulic. Fits where others won't. Bulletin 101A.

Whether you operate O-M Cylinders, of the same psi rating, bore and stroke, singly or in sequence, each one will exert the same force, handle the same work load, with the same precision. In addition, the direction of each stroke, length of each stroke as well as the time interval between cycles will be controlled to the same high degree of accuracy. As all parts and mounts of O-M Cylinders, of the same capacity, are micro-honed or accurately machined to the same close tolerances, they are interchangeable and precise. Uniform operation is automatic.

O-M Cylinders are available in a complete range of sizes (1½" to 8" bores) with standard or heavy-duty rods. Complete line of interchangeable parts and mounts. Immediate delivery on most sizes.

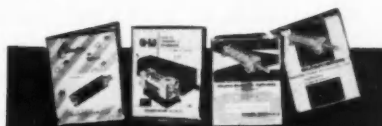
Coupon below will bring our latest bulletins showing construction and dimensional details, engineering drawings, capacity chart and mounting data for each O-M Air and Hydraulic Cylinder. MAIL COUPON TODAY for your copies.

Bulletin 101A for Internal Key Tie-Rodless type Air and Hydraulic Cylinders featured above.

Bulletin 105A—Improved Tie-Rod (Heavy Duty) Cylinders Hydraulic 2000 psi; 3000 psi non-shock.

Bulletin 107—Automation (Heavy Duty) Air Cylinder for 200 psi operation.

Bulletin 108—Automation (Heavy Duty) Hydraulic Cylinder—for 1000 psi operation.



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ASSISTANT EDITOR

AI Indexes 1 & 2

AUTOMOTIVE INDUSTRIES semi-annual indexes, volume 122 covering January 1, 1960 to June 15, 1960, and Volume 123 covering July 1, 1960 to December 15, 1960, are available to readers. For your copy of volume 122 circle #1 on the inquiry card. For volume 123 circle #2.

Gear Roller 3

Various types of gear and spline rolling machines are discussed in a six page illustrated folder. It shows typical examples of gear and spline manufacturing. Charts, graphs and line drawings are included to complete the data. *Grob, Inc.*

Bar Machines 4

An illustrated, four page bulletin contains complete specification information and operating characteristics of automatic bar machines and their accessories. Each part is described in detail as to its function and features. Special attachments and service data are also given. *American Bechler Corp.*

Rust Prevention 5

Tested and proven procedures for preventing and removing rust under almost any condition are detailed in bulletin number 16B. Many common industrial problems are covered in the publication. *Oakite Products, Inc.*

Analysis Systems 6

Two new automatic wave analysis systems, a cross spectral analyzer and a two-channel analyzer for transfer function plotting, are described in a 16-page Honeywell publication, DB 9075. Brochure includes complete specifications, charts, formulae and available options. *Minneapolis - Honeywell, Industrial Systems Div.*

Precision Stock 7

A new binder describes three grades of precision ground stock. The illustrated file folder cites the advantages of using precision ground steels and explains the features of each grade including the chemical composition and typical applications. *Vanadium-Alloys Steel Co.*

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Diesel Engines 8

Features of the recently intro-
duced Allis Chalmers models 10000
and 11000 Diesel engines are de-
scribed by the illustrated text mat-
ter of an eight page catalog. Per-
formance curves and charts, in-
cluding cut-aways explain a "New
Kind of Diesel Work Power" pro-
vided by these two engines. *Allis-
Chalmers Mfg. Co.*

Inspection Equipment 9

Construction, operation and spe-
cification information on non-de-
structive test equipment is covered
in an illustrated data sheet. It
covers the use, capacity and physi-
cal characteristics of the units.
Radionics, Inc.

Power Units 10

A new bulletin completely cata-
logs 37 hydraulic power units. All
pertinent application information
is included concerning twelve 1000
and 2000 psi single pump models,
fifteen double pump models of sim-
ilar working capacities, and ten
continuous booster models featur-
ing automatic pressure intensifica-
tion to 5000 psi. *Hannifin Co.*

Motion Detector 11

A four page booklet describes
the operation and function of
micro-motion detectors. In addition
to specification data there are line
drawings to show how and where
the detectors are used. Detection
model types are also covered. *Gay-
lord Controls Div., Gaylord Prod-
ucts, Inc.*

Press Brakes 12

Catalog 6-60 covers technical and
specification information on a com-
plete line of press brakes and re-
lated equipment. Vastly illustrated,
this literature contains numerous
charts to cover the line. *Verson
Allstate Press Co.*

Die Steel 13

Data sheet 12 describes the char-
acteristics and typical applications
of a chromium alloy die steel that
can be used for both hot and cold
work operations. Included are in-
structions for forging, annealing,
hardening and tempering, along
with other information. *Heppen-
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Form Tools & Blanks 14

A new catalog, #61, covers a complete line of standard circular form tools and blanks for use in automatic screw machines. Featured in this new catalog is a complete range of cut-off and form tool blanks made of T-15 Vasco Supreme HSS. Also listed are new grinding arbors for all sizes of Brown & Sharp and Davenport tools. *The Somma Tool Co.*

Blast Cleaning 15

Exclusive features found in Pangborn's standard-duty line of blast cleaning barrels is described in Bulletin No. 706. This 16-page booklet is directed to manufacturers of castings, forgings, weldments and plastics. It is well illustrated with diagrams and photographs, and contains brief specifications and dimensions of each of the five sizes ranging in capacity from 1½ to 18 cu ft.

A number of case histories are outlined to show how many companies have realized substantial profits by using either standard or automated Rotoblast units. Outstanding features of the abrasive impeller, heart of each Rotoblast unit, are described and illustrated. *Pangborn Corp.*

Template Kits 16

A complete kit of full-size tracing templates for jig and fixture components are available to tool designers, engineers and draftsmen. Printed on one side only on individual 8½ by 11 in. sheets of translucent paper, the templates can be used as overlays for correct location of components on drawings and to check fit. They can be slipped under drawings for tracing as either right or left hand components. *Jergens Tool Specialty Co.*

Sprag Clutches 17

A four page folder has a color coded tabulation which shows the tooling status of a clutch program listed on the basis of clutch torque capacity versus inner race diameter with six different clutch lengths. Divided into 10 different sections this chart shows all important specifications. Also listed are sizes proposed for future production. *Borg-Warner Corp.*

Acetal Resin 18

"This is Delrin" is the title of a 23 page brochure which deals with the properties of Delrin acetal resin, particularly as related to specific applications. Covered are the design potential, molding, fabricating and forming techniques and ten examples of Delrin at work in a variety of products. Numerous charts, illustrations and graphs cover the technical information for this product. *E. I. du Pont de Nemours and Co.*

Grinding Wheels 19

A new publication, "American Standard Specifications for Standard Shapes and Sizes of Grinding Wheels," has been approved by the American Standards Association. Known as B74.2-1960, this literature contains numerous illustrations of various types of grinding wheels and lists the different specifications for each. Listed in the 39 page brochure are the various organizations who assisted in approving the information in this issue. *Grinding Wheel Institute.*

Cost Cutting 20

A new 80 page book, "Handbook of cost cutting materials handling ideas," has been released. All the aspects involved in these operations are discussed in this publication, giving the pro and con of many. *The Automatic Transportation Co.*

Tape Control 21

Bulletin illustrates and gives complete specifications of a new Burgmaster model 3BHT-B tape controlled 8-spindle turret drilling, tapping and boring machine. Line drawings show complete measurements of the unit. *Burg Tool Mfg. Co.*

Lubricant Coating 22

The characteristics of Molykote PVE, a new bonded lubricant coating for ferrous surfaced, are described in a new data sheet. In addition to giving full specifications for the coating, the two page bulletin covers information from actual tests of the material on metal cutting tools. Bulletin 129 may be obtained from the *Alpha-Molykote Corp.*

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Designer's Digest 23

The application of Grey Iron castings in the automotive industry is discussed in a four page booklet. It contains various illustrations of components that are manufactured from Grey Iron. In addition to technical data the last page has a chart of *Society of Automotive Engineers* specifications for these castings. *Grey Iron Founders' Society, Inc.*

Silicone Rubber 24

This four page publication is designed to assist designers and engineers in selecting the proper type of silicone rubber for their particular requirements. It shows comprehensive data on applications, typical properties, primary classes and standard industry and military specifications. To simplify selection the booklet is divided into four general classes and typical uses of each class are described. The publication has been designated CDS-145C. *General Electric Co., Silicone Products Dept.*

Carbon Tool Steel 25

A general purpose, shallow hardening, fine grain carbon tool steel is covered in data sheet 11. Characteristics and typical applications are given. *Heppenstall Co.*

Metal Research 26

An 8-page brochure describes a new electronic system of searching metallurgical and related literature for specific information on subjects. Discusses the mechanized way to reduce costs and increase accuracy, speed and effectiveness. Shows how subscribers may receive, every two weeks, information on anything published in the preceding two weeks on their field of interest. *American Society for Metals.*

Panel Meters

A new 24 page technical catalog covers a complete line of electrical indicating panel instruments. Detailed specifications, outline drawings and general information covering a wide range of miniature and full size units from ½ in. diameter to 4½ in. diameter are included. Please write on company letterhead to: *Electronic Sales Div., DeJur-Amsco Corp.*

Industrial Diamonds

The history of a half-century of diamonds for industry is the theme of a booklet which is recommended reading for the tool and manufacturing engineer. Write on Company Letterhead to: *H. E. Robison, President, Wheel Trueing Tool Co., 3200 W. Davison Ave., Detroit 38, Michigan.*

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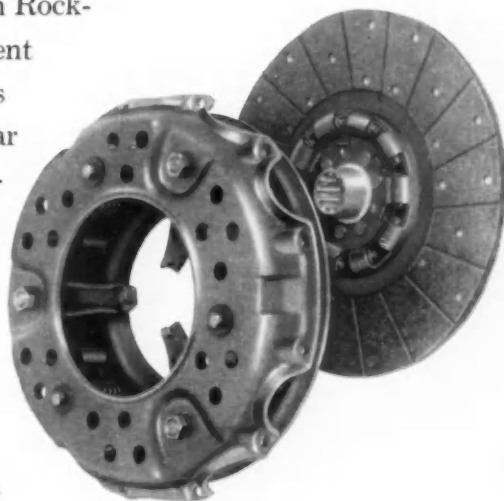
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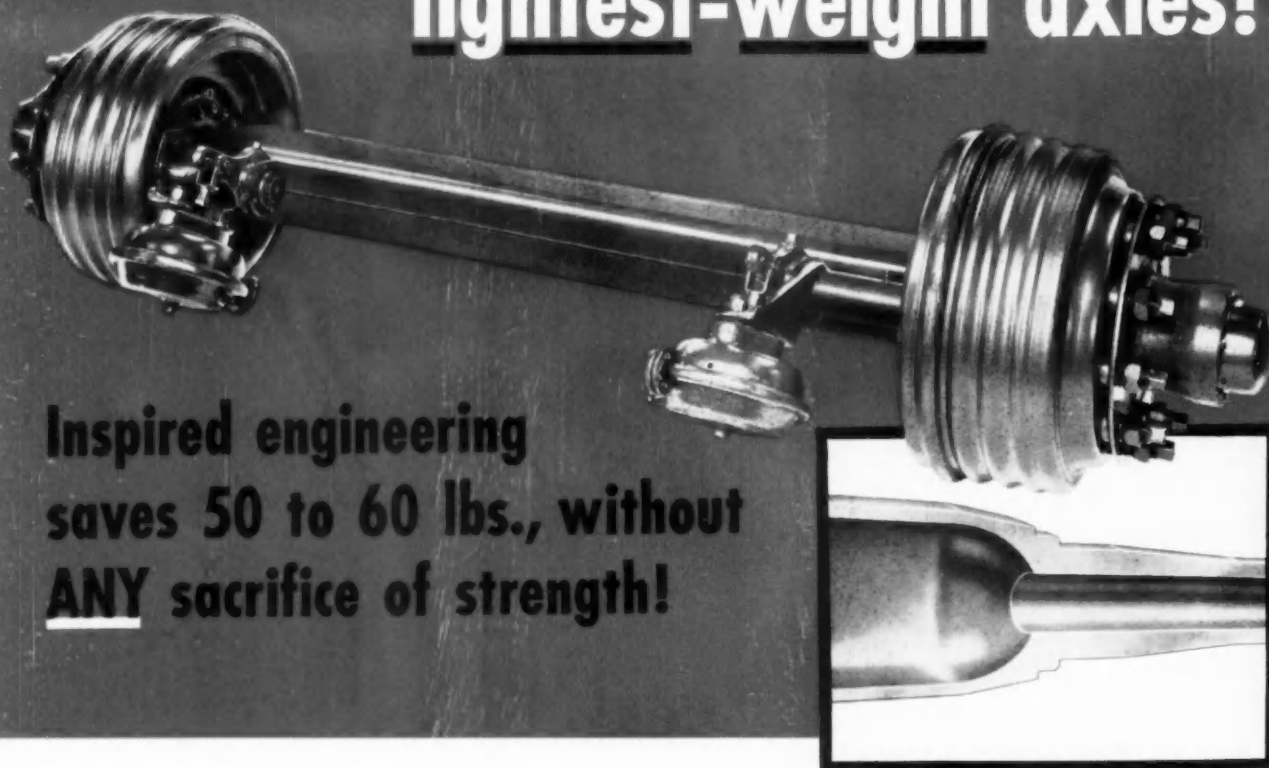
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SHULER announces the world's lightest-weight axles!



Inspired engineering
saves 50 to 60 lbs., without
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Thanks to a completely new engineering approach — thanks to five years of research and continuous development — thanks to the rugged toughness of a specially-designed steel, Shuler now offers you the world's lightest-weight trailer axles, at no increase in price!

The astonishing new Shuler 20L axle is a major breakthrough in weight-saving techniques. It is the ultimate in modern design, the last possible word under existing engineering potentials. It is equal to our T-18C 20,000-lb. tubular axle which it replaces, yet it saves 50 lbs. per axle!

20L has been thoroughly proven in extensive laboratory tests and by thousands of miles of accelerated road tests.* We urge you to investigate this brilliant achievement.

*Incidentally, the new Shuler self-contained brake has permanent oil seals on the cam-shaft, assuring full lubrication for many extra months of trouble-free operation between servings.

SHULER AXLE COMPANY
Incorporated
2900 Second Street, LOUISVILLE 8, KENTUCKY



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